VOLUME XLVII NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

MAY, 1925

CONTENTS

SIXTEEN PAGES OF ILLUSTRATIONS IN FULL COLOR

Through the Back Doors of Belgium
With 40 Illustrations MELVILLE CHATER

Ferns as a Hobby
With 29 Illustrations WILLIAM R. MAXON

Marvels of Fern Life
16 Paintings from Life E. J. GESKE

Tracking the Columbian Ground-Squirrel to Its Burrow
With 13 Illustrations WILLIAM T. SHAW

Helsingfors—A Contrast in Light and Shade
With 20 Illustrations FRANK P. S. GLASSEY

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

$3.50 A YEAR 50¢ THE COPY

XUM

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

GILBERT GROSVENOR, President
HENRY WHITE, Vice-President
JOHN OLIVER LA GORCE, Vice-President
O. P. AUSTIN, Secretary
JOHN JOY EDSON, Treasurer
GEO. W. HUTCHISON, Associate Secretary
BOYD TAYLOR, Assistant Treasurer
EDWIN P. GROSVENOR, General Counsel
FREDERICK V. COVILLE, Chairman Committee on Research

EXECUTIVE STAFF OF THE NATIONAL GEOGRAPHIC MAGAZINE

GILBERT GROSVENOR, EDITOR

JOHN OLIVER LA GORCE, Associate Editor

WILLIAM J. SHOWALTER, Assistant Editor
RALPH A. GRAVES, Assistant Editor
FRANKLIN L. FISHER, Chief of Illustrations Division
J. R. HILDEBRAND, Chief of School Service

BOARD OF TRUSTEES

CHARLES J. BELL
President American Security and Trust Company

JOHN JOY EDSON
Chairman of the Board, Washington Loan & Trust Company

DAVID FAIRCHILD
In Charge of Agricultural Explorations, U. S. Department of Agriculture

C. HART MERRIAM
Member National Academy of Sciences

O. P. AUSTIN
Statistician

GEORGE R. PUTNAM
Commissioner U. S. Bureau of Lighthouses

GEORGE SHIRAS, 3D
Formerly Member U. S. Congress, Faunal Naturalist, and Wild-game Photographer

E. LESTER JONES
Director U. S. Coast and Geodetic Survey

WILLIAM HOWARD TAFT
Chief Justice of the United States

GRANT SQUIRES
Military Intelligence Division, General Staff, New York

C. M. CHESTER
Rear Admiral U. S. Navy, Formerly Supt. U. S. Naval Observatory

J. HOWARD GORE
Prof. Emeritus Mathematics, The George Washington University

FREDERICK V. COVILLE
Botanist, U. S. Department of Agriculture

RUDOLPH KAUFFMANN
Managing Editor The Evening Star

JOHN FOOTE, M. D.
Professor of Pediatrics, Georgetown University

JOHN OLIVER LA GORCE
Associate Editor National Geographic Magazine

CHARLES G. DAWES
Vice-President of the United States

JOHN BARTON PAYNE
Chairman American Red Cross

A. W. GREELY
Arctic Explorer, Major General U. S. Army

GILBERT GROSVENOR
Editor of National Geographic Magazine

GEORGE OTIS SMITH
Director U. S. Geological Survey

O. H. TITTMANN
Formerly Superintendent U. S. Coast and Geodetic Survey

HENRY WHITE
Member American Peace Commission, Formerly U. S. Ambassador to France, Italy, etc.

STEPHEN T. MATHER
Director National Park Service

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

TO carry out the purposes for which it was founded thirty-seven years ago, the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

Copyright, 1925, by National Geographic Society, Washington, D. C., in the United States and Great Britain. All rights reserved. Entered at the Post Office at Washington, D. C., as Second-Class Mail Matter. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917, authorized July 1, 1918.

This Accurate Watch Keeps America's Crack Trains on Schedule

Why the fastest trains in the world are timed with this watch.

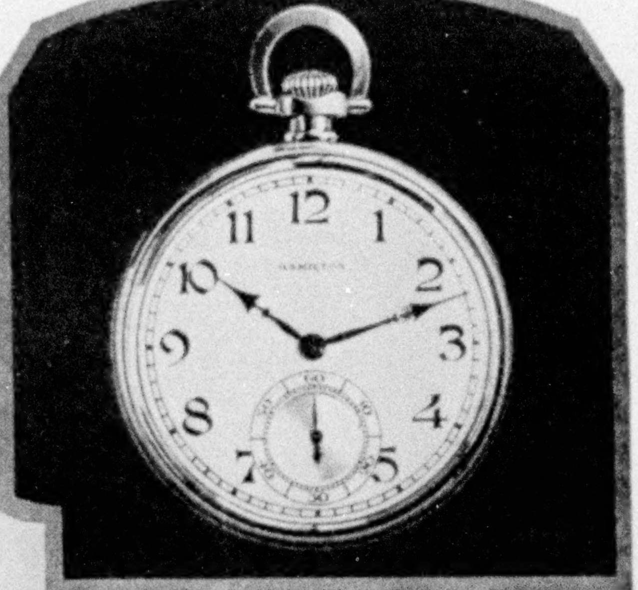
"WHAT TIME HAVE YOU?" Ask this question of a group of business men. Out come their watches. One watch is three minutes slow, another five minutes fast, and so on. But ask this question of a group of railroad men. If there is any variation it is usually only a matter of seconds.

Yet it is so very easy for every business and professional man to have a watch as unfailingly accurate as the railroad man's. When you buy a watch get the make he uses. For thirty years there has been one watch that has been generally favored on America's railroads, a watch that has earned the unique distinction of being called "The Railroad Timekeeper of America."

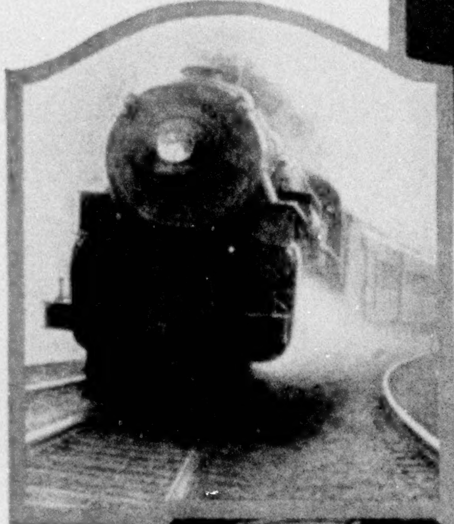
This watch of accuracy fame is the Hamilton. It rides in cab and coach of such famous fliers as the Twentieth Century, the California Limited, the Broadway Limited and the Olympian. When you buy a Hamilton, accuracy is assured.

The secret of Hamilton's accuracy is capacity to take infinite pains. With us every watch is an individual piece of fine mechanism, tested and retested until final accuracy is obtained.

No Hamilton leaves our factory until it has proved itself worthy of the Hamilton name, and is ready to serve you as an accurate timekeeper. This insures the quality of the Hamilton Watch that you purchase and enables us to give a broad guarantee of satisfaction.



The watch above is the new Frodsham design. Hamilton Watches may be had in yellow, white or green gold—14k or filled, plain or engraved. Prices $48 to $250. You can choose from a wide variety of cases and dials.



The Twentieth Century Limited speeding along the shores of the Hudson River. This is one of the famous fliers timed by the Hamilton. (Picture reproduced from an oil painting, copyright, 1923, by the New York Central Railroad Co.)

Above is the new woman's Tonneau model wrist watch. Milady's Hamilton comes in silk ribbon models, detachable bracelet models and strap models. Cases are plain or engraved in yellow, white or green gold, 14k and filled. Prices $46, $48, and $60.

A Hamilton Watch to suit your individual preference may be selected from a number of beautiful cases and dials. Some are simple, graceful, and chaste. Some are beautifully engraved and ornamented. All have an intrinsic beauty that will keep them fashionable after years of service.

Ask your jeweler to show you a Hamilton today. He can show you Hamilton pocket and strap watches for men and charming wrist watches for women. Send for a copy of our new illustrated booklet, "The Timekeeper." Address Dept. 1-C1, Hamilton Watch Company, on the Lincoln Highway, Lancaster, Pa., U.S.A.

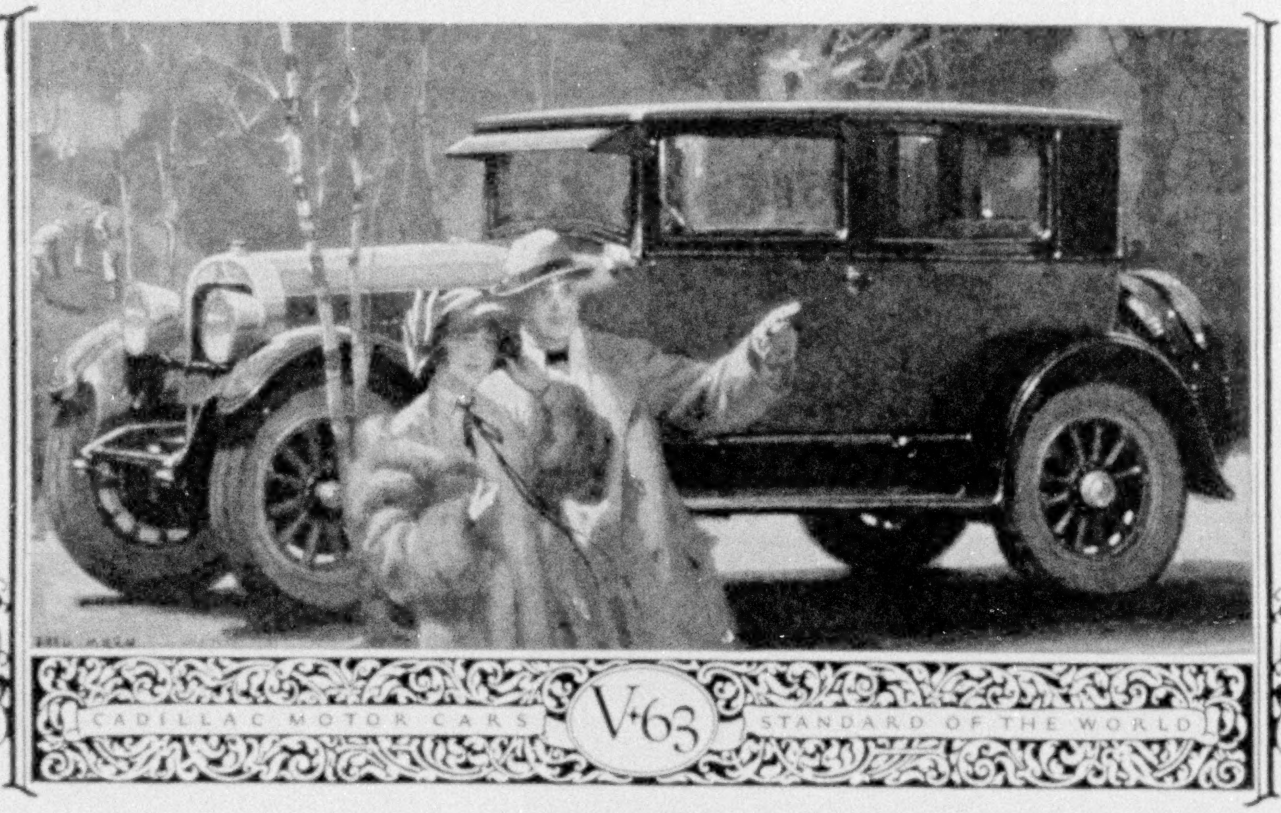
Hamilton Watch

The Watch of Railroad Accuracy

XUM

CADILLAC-COACH

A New V-63 Closed Model at the Same Price as the Touring Car—$3185 f. o. b. Detroit



Many Are Deciding That Their Day of *Cadillac Ownership* is Here

A logical thing is happening in the motor car market . . . It is the "stepping up" of a large number of motorists from ordinary automobiles to the outstanding *fine* automobile.

For years, these men and women have desired Cadillac closed cars. For years they have been thinking, "Some day Cadillac will build a closed model priced but little higher than closed cars of average quality—then nothing will stop me from owning one."

Now, in the Cadillac Coach, mounted on the V-63 chassis with its harmonized 90° V-Type eight-cylinder engine and built-in Cadillac Four-Wheel Brakes, these motorists recognize the car they have been awaiting and anticipating.

Eagerly, they are fulfilling their desire for Cadillac ownership.

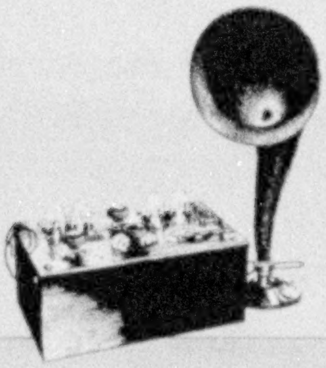
CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

The human desire to own the best suggests The CADILLAC

$35

Radiola III, that gets far stations on the headphones, and nearby stations on a loudspeaker. With two Radiotrons WD-11, and headphones. $35

Small price for big performance — achieved in Radiola III



Radiola III-a, for distance on a loudspeaker. With four Radiotrons WD-11, headphones and Radiola Loudspeaker. $83

Radiola

PRODUCED ONLY BY RCA

RCA

How the Radio Corporation of America is Meeting the Responsibility of Leadership

It has made America the radio center of the world, through the high power radio telegraph circuits that link our country, by direct radio communication, with seven countries of Europe, with Asia and with South America.

It has developed radio ship sets, and a ship-to-shore radio service that makes the high seas safer, and aids all marine commerce.

It has the technical resources of laboratories for research that not only carry on unceasing experiment for the perfecting of Radiolas and Radiotrons, but study the problems of high power commercial transmission, and conduct research into every phase of radio.

With its associates, the Radio Corporation of America maintains ten powerful broadcasting stations, whose programs serve the whole nation: WJZ, WJY, WGY, WBZ, WRC, KDKA, KOA, KFKX, KGO, KYW – from New York to California!

By its extensive research in the development of Radiotrons, the standard vacuum tubes of radio, it has made contributions of inestimable value to radio progress.

RADIO CORPORATION OF AMERICA
Sales Offices: Suite 355
233 Broadway, New York
10 So. La Salle St., Chicago, Ill.
28 Geary St., San Francisco, California

THE

CRUISES SUPREME 1926

The two Most Notable

ANNUAL TRAVEL EVENTS

Around the World

by the specially chartered Cunarder

"FRANCONIA"

sailing Jan. 14 returning May 24

The Mediterranean

by the specially chartered White Star Liner

"HOMERIC"

sailing Jan. 23 returning March 31

These two cruises *stand supreme* in their field, just as our world-wide organization and unique resources, perfected throughout eighty-five years of service to the traveling public, *remain paramount.*

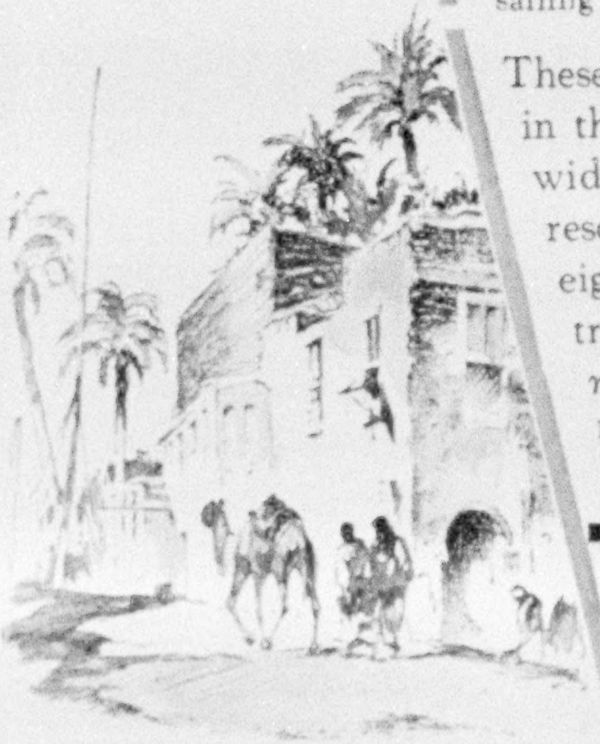
INQUIRIES CORDIALLY INVITED

Reservations may be made now

THOS. COOK & SON

NEW YORK

Boston Philadelphia Chicago St. Louis
San Francisco Los Angeles Toronto
Montreal Vancouver



A GIFT WITH HEART-BEATS THROBBING WITH THE LOVE OF THE GIVER

TO father and mother, the gift to the girl graduate is the most sacred of all gifts. For often it is the last important gift to The-Little-Girl-Who-Is-Theirs.

In future years, they may send her other gifts—bridal gifts, house-warming gifts, anniversary gifts. But these will go to The-Woman-Who-Belongs-To-Some-One-Else.

How natural, then, that this quest should be a searching one—waged with that keenness which only parental-love inspires.

How natural, too, that the final selection should be an ELGIN WRIST WATCH—a gift that is a living thing—with every tick a heart beat, delivering its devoted message through a lifetime of service.

An Elgin possesses the three supreme gift essentials—reliability, beauty and value.

Elgin's sixty years leadership in the whole world's watch business insures this trinity.

That the majority of all gift-watches are Elgins is evidence enough for intuitive Mother and reasoning Father.

ELGIN WRIST WATCHES cased in gold, jeweled set and gold filled. May be had from your jeweler in a wide range of prices.

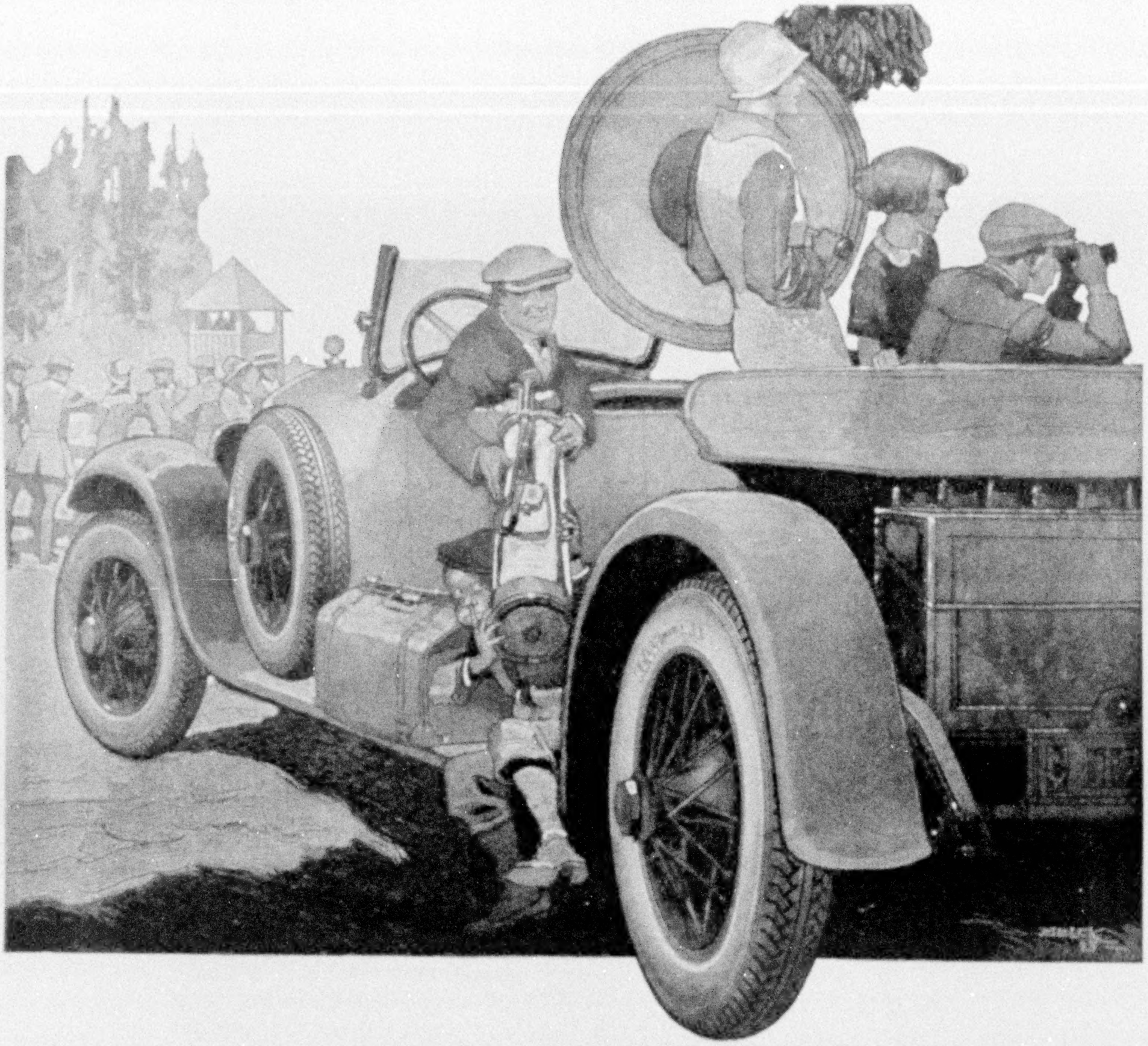
ELGIN

THE WATCH WORD FOR ELEGANCE AND EFFICIENCY

ELGIN NATIONAL WATCH COMPANY, ELGIN, U. S. A.

© E. N. W. CO.

The KELLY FLEXIBLE CORD



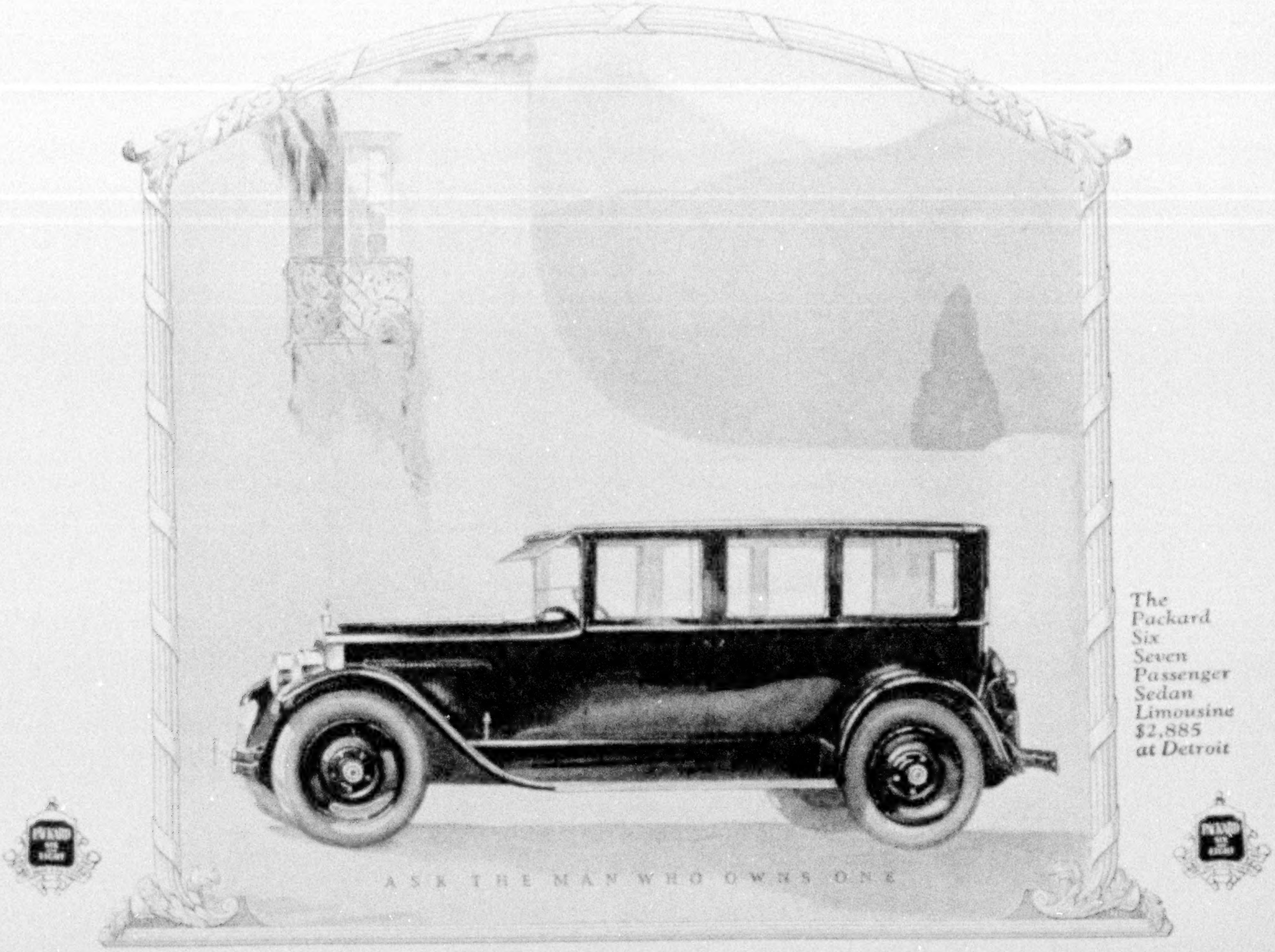
A REALLY great tire is this new Kelly Cord. It will exceed even the record of its predecessors by many miles of unbroken, silent service.

Flexible as an Indian moccasin, because of the Integral Bead construction—an exclusive Kelly method of building which has made possible not only a flexible carcass, but also a flexible tread, tough, rugged and safe on wet or slippery roads.

The Peregrinations of the Pecks

Pinehurst — perfect weather — horses for the family to watch— golf for Jim! The Pecks are traveling without any set schedule, stopping when, where and as long as they feel inclined, which is the only way to travel. So far, their trip has been broken only by three days of sightseeing in Washington. Just where they are going from Pinehurst we don't know yet, but understand that they expect to strike westward. Neither car nor tires have had a real test yet—but they will, before the end of the trip.

KELLY~SPRINGFIELD TIRES



The Packard Six Seven Passenger Sedan Limousine $2,885 at Detroit

"A TALE OF TWO CITIES"—OR A HUNDRED

THE average Packard Six owner expects to keep his car nearly three times as long as the car he traded in.

Records compiled during the last six months show that 90% of Packard owners expect to keep their cars three years—75% four years and 60% five years or more.

Every seventh Packard Six owner expects to keep his car ten years.

The Packard owner does more than *expect* to keep his car—*he keeps it.*

For example, in Wilkes-Barre, Pa., a city of 77,000 population, Packard Six cars have been sold to 215 owners during the past five years.

Two hundred and twelve of the 215 still have Packard cars—their original cars, except where enclosed or larger ones were desired.

In Youngstown, Ohio the record is 197 out of 200.

In the Packard Six, beauty, distinction, comfort and pride of possession are most liberally combined with long life and economy of operating and maintenance charges.

The Packard Six and the Packard Eight both are furnished in ten body types, four open and six enclosed. A liberal monthly payment plan makes possible the immediate enjoyment of a Packard, purchasing out of income instead of capital.

PACKARD

DODGE BROTHERS
COACH

A popular and attractive addition to Dodge Brothers line of motor cars.

Every coach convenience is provided: unfettered vision on all sides, an intimate yet roomy interior, easy handling in traffic, protection for children against open rear doors, modish hardware and finish, balloon tires and smart whipcord upholstery.

Built on Dodge Brothers sturdy chassis, the Coach will deliver years of dependable service at a very moderate annual cost.

It is available both in the Standard and completely equipped Special types.

DODGE BROTHERS, INC. DETROIT
DODGE BROTHERS (CANADA) LIMITED
TORONTO, ONTARIO

MEDITERRANEAN SUMMER CRUISE

THE Route which has been devised is more fully rounded—more complete than was ever before planned for a cruise in the brilliant Mediterranean field. Included in the course, which visits 30 cities in 13 countries, are Rome, Venice, Pisa, Granada, Tangier, Algiers, Naples, the Riviera, Ragusa, Cattaro, Athens, Constantinople, Cairo, and others.

The Summer is usually the most auspicious time to visit the Mediterranean countries—the days are long, the weather seasonable, and many of the countries really at their best.

The Cruise Ship is the S.S. "Oronsay"—a brand new, 20,000-ton liner, 657 feet long—the largest ship ever to make a summer Mediterranean voyage. Only outside rooms will be sold on this splendidly modern cruiser. The Cruise sails from New York June 27, 1925. 53 days. Rates $675 & up.

ROUND THE WORLD

IN the Cruise sailing on October 10, Raymond-Whitcomb have planned a course which is really "Round the World". Touching every continent—visiting for the first time in cruise history the remote wonders of Australia, New Zealand, Tasmania, and New Guinea—and of course, calling at ports and cities in Java, Japan, China, India, Egypt, etc.—cruising for 143 days on a course of 37,000 miles—this comprehensive 1925 Round the World Cruise is a cruise on which all others may well be modelled. The Ship is the luxurious, new, 20,000-ton Cunarder "Carinthia", with over 100 single rooms, some 80 rooms connected with private bath—a swimming pool, squash court, gymnasium. Rates $2,000 & up.

"MIDNIGHT SUN" CRUISE

THE fifth Annual Raymond-Whitcomb "Midnight Sun Cruise" leaves New York June 30. In 31 days the 20,000-ton Cunarder "Franconia"—one of the best known cruise ships—will visit Iceland, the North Cape, the Norwegian Fjords, Sweden, Denmark, Holland, France, England. This cruise is always popular with business men and young folks. Rates $725 & up.

TRAVEL SERVICE IN EUROPE

Raymond-Whitcomb Europe Tours leave frequently during the summer. And as always our "Individual Travel Service" smooths the way for those who wish to travel "without escort".

Send for Cruise and Tour Booklets and Travel Guides

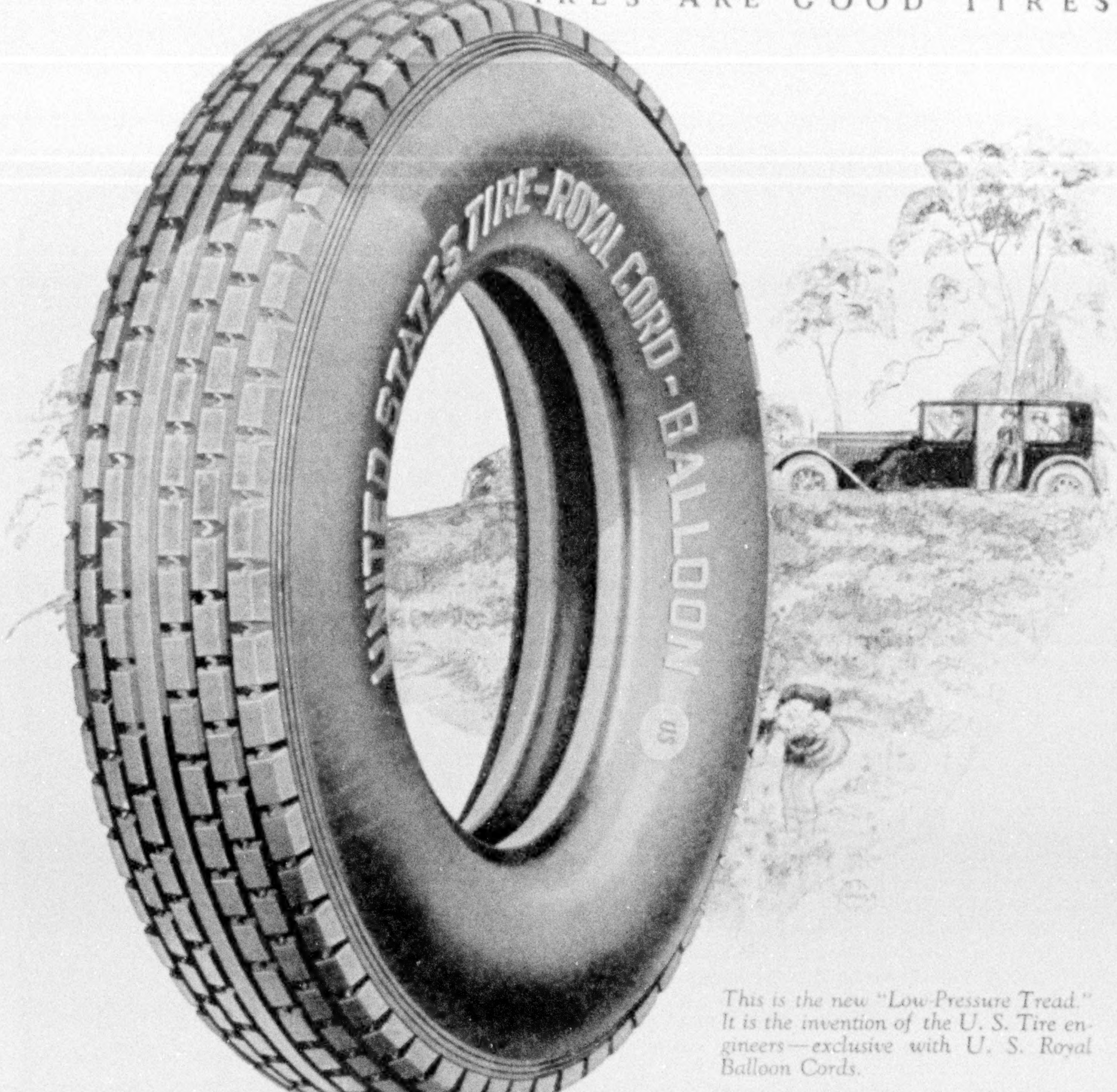
RAYMOND & WHITCOMB CO.

Executive Offices: 26 Beacon Street, Boston

NEW YORK CHICAGO PHILADELPHIA
LOS ANGELES SAN FRANCISCO

R.F.C.

UNITED STATES TIRES ARE GOOD TIRES



This is the new "Low-Pressure Tread." It is the invention of the U. S. Tire engineers—exclusive with U. S. Royal Balloon Cords.

If you want your tires to wear evenly and slowly—take special notice of the shape of the tread on the above tire.

It is designed specifically to operate at the low inflations necessary to give *real* balloon tire cushioning and comfort without sacrificing mileage.

It successfully eliminates early, uneven and disfiguring tread wear.

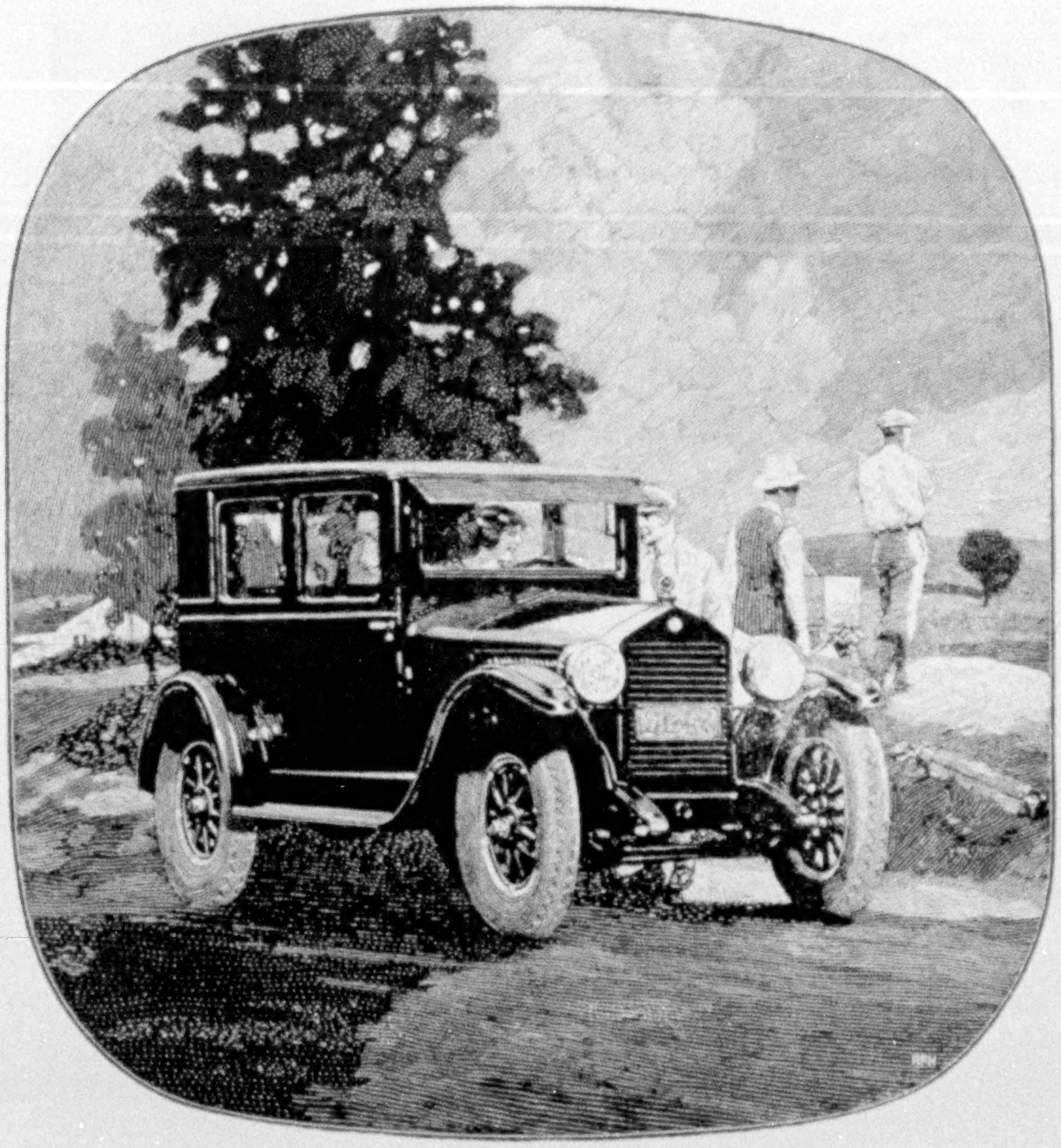
It also gives better traction, better non-skid protection, easier steering and greater stability.

It is still another evidence that U. S. Royal Balloon Cords are truly—"The Balloon Tire principle at its Best."

United States Rubber Company
Trade Mark

U.S. Royal Balloon Cords

Built of Latex-treated Web-Cord



Essex Alone Gives This Quality and This Price

The Reason for Its Amazing Sale

Buyers know what Essex gives can be had elsewhere only at far higher cost. The great Essex sales record is due to no other thing. It is recognition of a value leadership so overwhelming that it is not even challenged.

Today's Essex is the greatest of all Essex values. It is the finest Essex ever built. It is the smoothest, most reliable Essex ever built. It is the best looking, most comfortably riding Essex ever built. We believe its maintenance and operation the most economical of any car in the world. And the price, because of famous patents, with volume manufacturing advantages that are absolutely exclusive, is the lowest at which Essex ever sold.

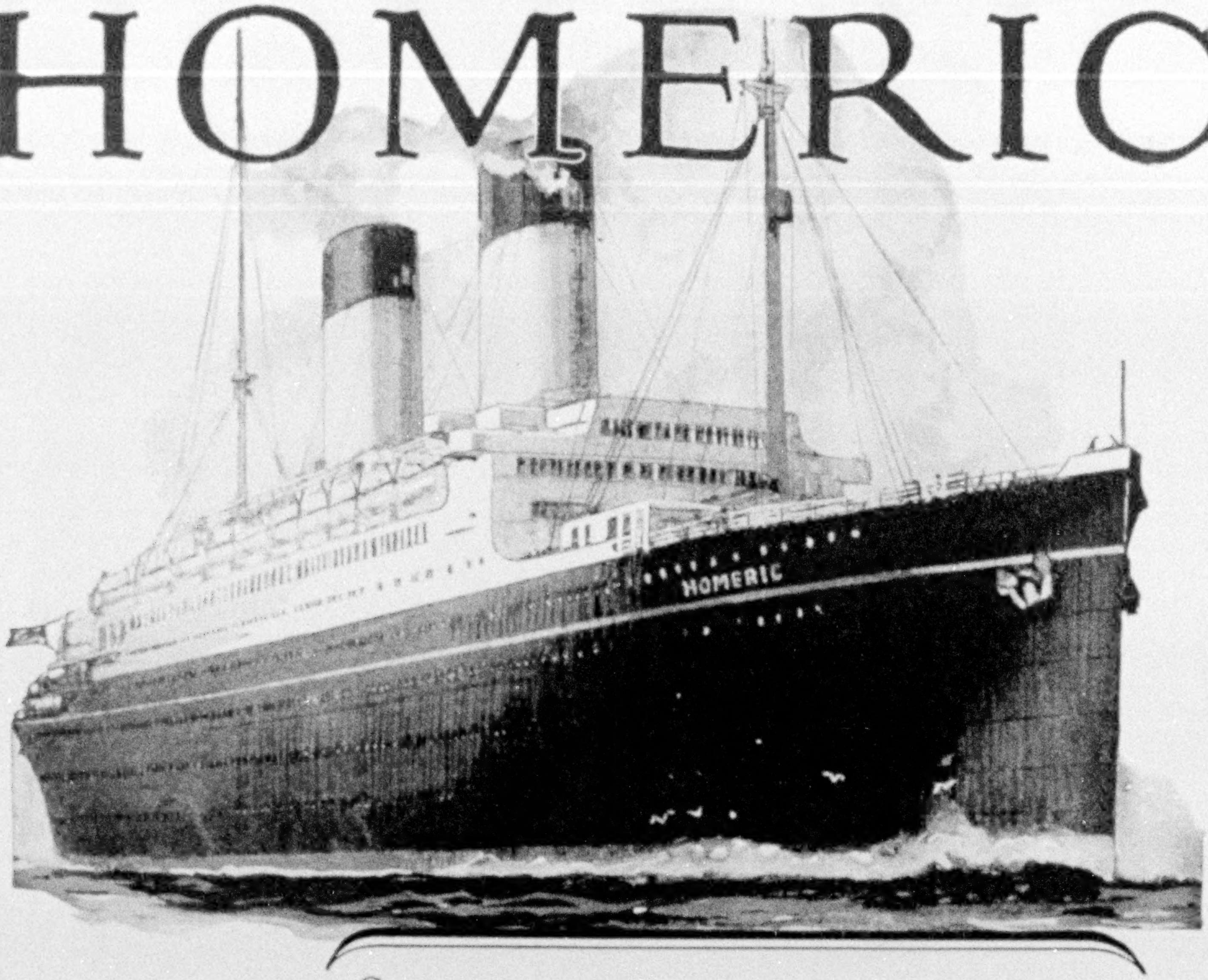
Essex won its wide acknowledgment on finest quality without useless size or weight, and a price advantage equaled nowhere in the world.

On every side its hosts of owners praise it with such pride and conviction as we have never heard for any other car. It is reflected in the greatest sales in our history. Wherever you go, note how Hudson-Essex outnumber all new cars. It is the surpassing proof of value—greatest sales.

THE FINEST ESSEX EVER BUILT, $895

Freight and Tax Extra

HOMERIC



The Ship of Splendor

Spaciousness is the keynote of the *Homeric*.

In lofty public rooms or on broad promenade decks, you will be impressed by it. However large her passenger list, she is uncrowded.

For this reason her atmosphere is most agreeable to the luxurious traveler whose satisfaction is enhanced by the quiet richness of her furnishings and decorations.

In every detail of service, whether in dining saloon or personal quarters, the *Homeric* is a proud embodiment of White Star standards founded on more than fifty years experience.

Together with the world's largest ship, *Majestic*, and the famous *Olympic*, the *Homeric* maintains a weekly schedule of Saturday sailings to Cherbourg and Southampton. Other sailings are provided by White Star and associated lines from New York, Boston, Montreal and Quebec to England, Ireland, France, Belgium and Germany.

WHITE STAR LINE

ATLANTIC TRANSPORT LINE · RED STAR LINE

INTERNATIONAL MERCANTILE MARINE COMPANY

For booklets and full information address the Company's office at New York, Boston, Washington, Pittsburgh, Baltimore, Philadelphia, Cleveland, Detroit, St. Louis, Montreal, New Orleans, Atlanta, Chicago, Minneapolis, Seattle, Los Angeles and San Francisco; our offices elsewhere or any authorized steamship agent.

Special Offer to Nature Lovers

Little Nature Library—4 Volumes, 1,104 Pages, 2,891 Subjects, Profusely Illustrated in Colors—Sent on 10 days' FREE EXAMINATION

HUNDREDS of the most interesting and absorbing stories you ever read are found in the four beautiful books of the Little Nature Library. Experts—not cold scientists merely, but warm nature lovers in every fibre of their beings—give freely of their lore.

One of them begins with the marvelous life of the trees. You come to understand how a tree breathes; how it digests its food; how it hibernates like certain animals, still alive, during the cold weather; how it provides in the fall for the spring to come. You learn to recognize the hundreds of species by leaf, by bark, by shape or stature. With this added knowledge the woods will present a thousand points of interest you never saw before.

The next one tells of the birds. Fascinating novelettes, delicious little comedies, absorbing tragedies are spread before you in the life stories of over 500 different bird species. You learn their songs and the meaning of the notes. You understand their wonderful guiding instincts. You appreciate their indispensability to human and animal life. You are prepared to recognize them on sight and to greet every one as a jolly, clever little friend.

The wild flowers, more than a hundred thousand of them, present endless avenues of unflagging interest. All the knowledge of a skilled botanist, combined with the insight for romance of a born story-teller, is offered you lavishly in the flower book.

And butterflies! Who has not marveled at their gorgeous beauty and wondered at their mysterious life-processes? The growth and development of those fairy creatures is fully and scientifically explained and illustrated, and you are introduced to and made thoroughly acquainted with their numerous species and genera.

The Little Nature Library

The Little Nature Library consists of four handsome volumes containing more than 1,100 pages—with 144 full-page illustrations in natural colors and 48 more in photographic black and white. Nearly 2,900 different subjects make it a perfect encyclopedia of its kind. The information is absolutely authoritative, written by recognized experts, yet put in easy, non-technical style that will delight you. The titles are: "Birds," by Neltje Blanchan; "Trees," by Julia Ellen Rogers; "Wild Flowers," by Neltje Blanchan, and "Butterflies," by Clarence Weed.

Do You Know

Why certain wild flowers smell sweeter in the evening than in the morning?

How the heavy seeds of the wild blackberry are carried to seemingly inaccessible places?

What are the common and scientific names of all the numerous species of butterflies?

Why a tree will die if only the bark is circled with a deep cut?

When the buds actually form on the twigs? Not in the spring, as is usually thought.

Where the butterflies may be found in winter?

Which bird never hatches its own eggs or cares for its young?

Send No Money

For a limited time we are making a Very Special Offer on these wonderful books. We are offering to send them FREE to any nature lover for 7 days' thorough examination. Merely fill out and mail the coupon below and they will come to you, at once, postpaid. Then examine them at your leisure for 7 days. Read as much as you like. If after 7 days' examination you are not perfectly delighted, you may return them and you will be absolutely nothing out. But if you want to keep them, as we feel sure you will, you not only can buy them now at an exceptionally low price, but you have three months in which to pay for them, at only $2.00 a month.

Don't let this opportunity pass. These are just the kind of books you have long wanted. Tear out the coupon NOW and mail it TO-DAY. Be sure to get in on this special offer.

NELSON DOUBLEDAY, INC.

Dept. L-795 **Garden City, N. Y.**

NELSON DOUBLEDAY, INC.
Dept. L-795, Garden City, N. Y.

Please send me the Little Nature Library for my 7 days' FREE examination. After 7 days, I will either send you $1.50 and then $2.00 a month for 3 months or return the books to you without owing you a cent.

Name ....

Address ....

City ....

If you prefer to pay cash, send only $7.00 in full payment.

[ ]Check here if you prefer three-quarter leather binding at $9.50. Payable $1.50 after 7 days and $2.00 a month for 4 months. (Cash price leather binding, $9.00.)

DEC. 3RD FROM NEW YORK

WORLD CRUISE

SEE THIS WORLD BEFORE THE NEXT

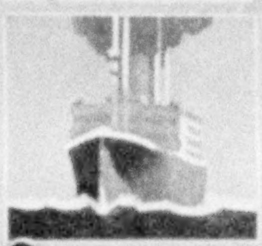
Go with

THE GREATEST TRAVEL SYSTEM

What a prospect! Thanksgiving at home. On December 3, goodbye winter. An epic Christmas, in the Holy Land. An exotic New Year's, in Cairo. India's wonders in cool season. The East Indies' magic under February's moon and Japan in plum blossom time. Home again, for the daffodils....Over four months, through 20 countries....Everywhere, delightful arrangements, made by Canadian Pacific's resident agents. Everywhere, guest-of-honor treatment, commanded by Canadian Pacific's connections....Throughout the 27,000 miles, a Canadian Pacific sea-staff and shore-staff are *united* in seeking your pleasure....That is why you will see the right things, at the right time, in the right way....Always, one home, the Empress of Scotland, 25,000 tons, famed for four previous cruises. Always, one standard of service, Canadian Pacific....What a wonderful way to make the most wonderful trip! Cost? Less than you think. Reservations? Better speak now.

Helpful Literature
Compiled by cruise experts. Inquire your local agent, or nearest Canadian Pacific Agent. New York, 344 Madison Ave., Chicago, 71 E. Jackson Blvd. Other principal cities. Personal service, if desired.

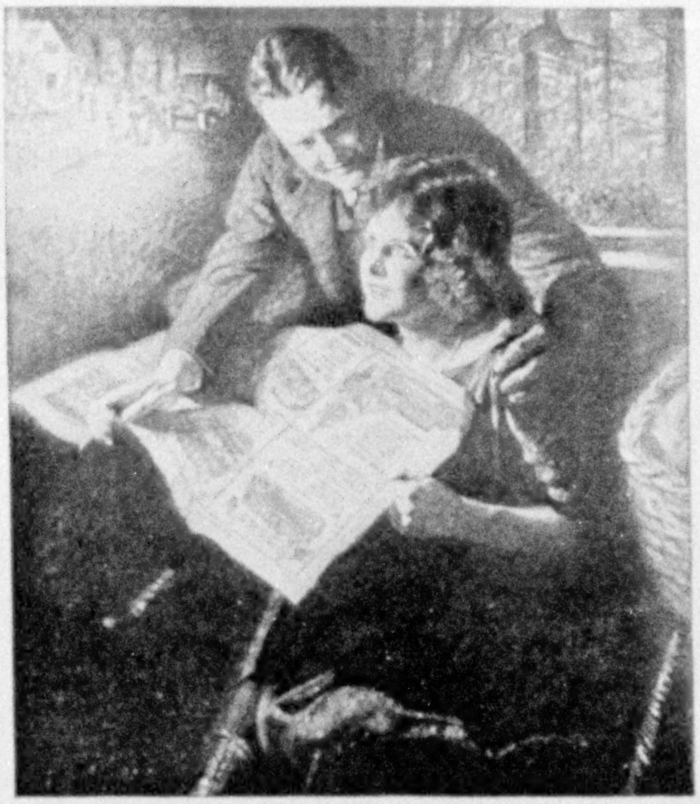
EMPRESS OF SCOTLAND 25000 TONS



ONE management ship & shore throughout

Canadian Pacific

FACTS ABOUT A FAMOUS FAMILY



General Motors has a car in every price class and aims to give the best value for your money. You can buy it out of income, just as you buy a home.

"Which car shall we buy?"

More than ever the public asks, before buying a car or truck: "Is it of an established make? Is the organization behind it strong? Will parts and service be readily available? Will it therefore have high resale value?"

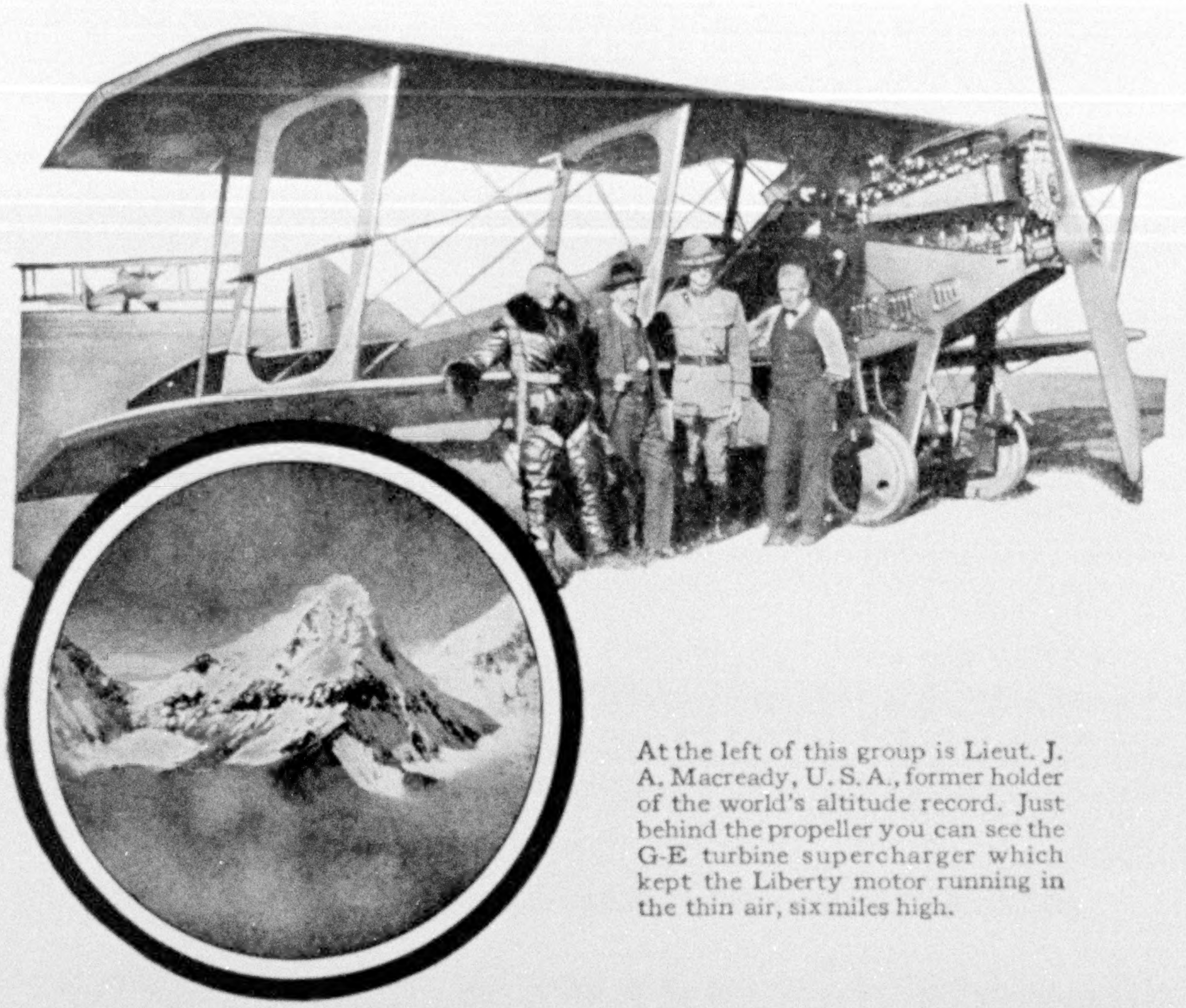
Each General Motors car is an established car; see their names below. Behind each car and truck are the resources of the whole big family. Each has parts, accessories and equipment made largely by General Motors and sold and serviced everywhere. And these factors, plus intrinsic worth, make for resale value.

So you are doubly assured of value and satisfaction when the car or truck you buy is a "Product of General Motors."

GENERAL MOTORS

BUICK · CADILLAC · CHEVROLET · OAKLAND
OLDSMOBILE · GMC TRUCKS

XUM



At the left of this group is Lieut. J. A. Macready, U. S. A., former holder of the world's altitude record. Just behind the propeller you can see the G-E turbine supercharger which kept the Liberty motor running in the thin air, six miles high.

Over the mountain by a mile

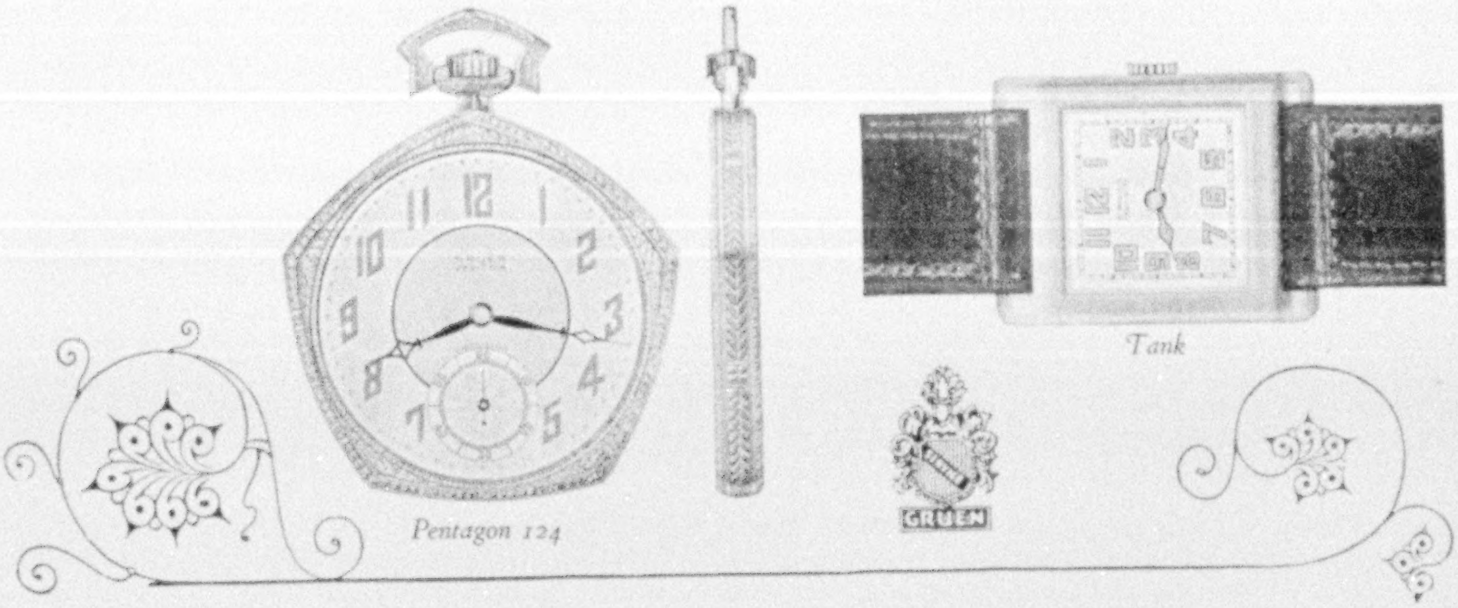
Year after year, plucky explorers try to climb Mount Everest, the world's highest peak, 29,141 feet high.

With a G-E supercharger feeding air at sea-level pressure to the engine, an airplane can go far higher. Lieut. Macready has reached 34,509 feet over Dayton, Ohio.

He would have soared over Mount Everest with more than a mile to spare!

The supercharger is a turbine air compressor, which revolves as fast as 41,000 times a minute—the highest speed ever developed by a commercial machine. It is designed and made by the General Electric Company, which builds the big turbines that supply electric light and power.

GENERAL ELECTRIC



Pentagon 124

Tank

THE mark "Precision" is engraved only upon Gruen Watches of higher quality and finer finish. We of the Gruen Guild engrave it there as our pledge that in that watch is a deep integrity of purpose.

It is no mere advertising word. It has as definite a meaning applied to the movement of a Gruen Watch as the mark 18K gold applied to the case.

A Gruen Watch with the mark "Precision" is a watch for which we admit no real competition.

We present it to you as the actual embodiment of that mechanical perfection which master watchmakers dream of producing.

Because the Gruen Precision Watch you buy demonstrates this over years of service, it becomes one of the prized possessions of your life, one of those enduring satisfactions beside which the first cost fades into insignificance.

Why not secure one of these watches for yourself, or give one to that beloved person whom you mean to honor on an approaching anniversary?

The better jewelers can show you the watches pictured here, as well as other Gruen Guild Watches in a large variety of models.

Pentagon 124 (Pat'd), *Precision* movement—Green or white gold reinforced, engraved or plain case, $75; solid green gold, plain case, $100; white, engraved, $135 up.

Tank (Pat'd), *Precision* movement—Green or white gold reinforced, $60; solid green gold, $75; white, $85; others to $250, according to case and movement.

Cartouche 96, *Precision* movement—Solid white gold, black finish engraved, $100; enamel, $110.

Cartouche 32, *Precision* movement—White gold reinforced, engraved and inlaid with enamel, $45.

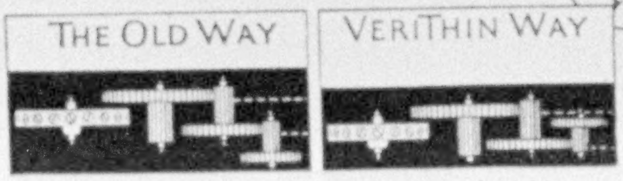
GRUEN WATCH MAKERS GUILD
Time Hill, Cincinnati, Ohio, U. S. A.
New York Toronto

Engaged in the art of fine watchmaking for more than half a century

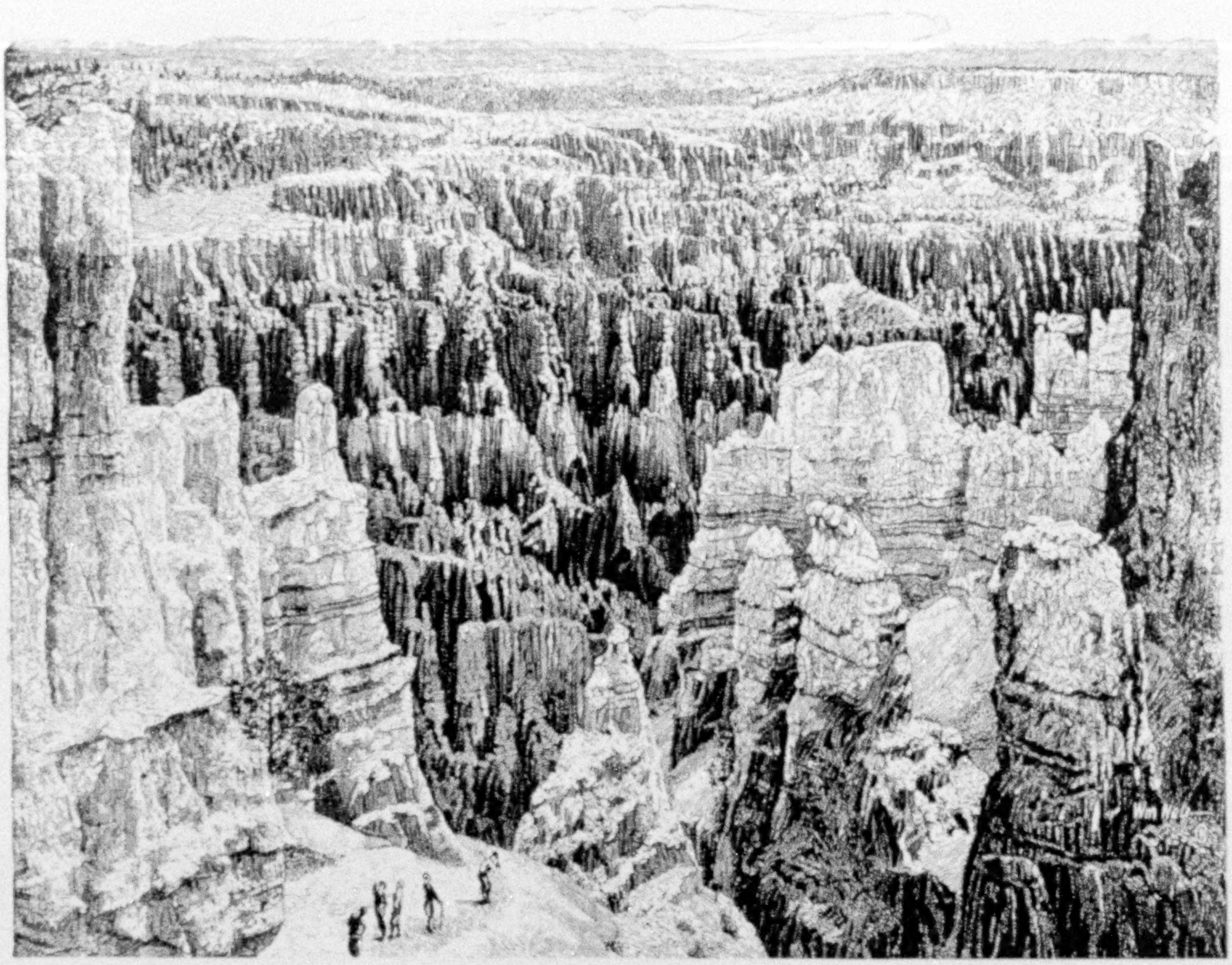
GRUEN Guild Watches

Cartouche 96

Cartouche 32



The Gruen VeriThin wheel train, one of the technical improvements by which an accurate watch is made THIN without loss in strength of parts



No Flight of Fancy Can Picture the Fascination of Bryce Canyon

Come with us to Southern Utah. Loose your imagination and you'll see thousands of fantastic giants and gnomes in bronze and onyx! Spires higher than the tallest skyscrapers! Minarets, pagodas, obelisks, cathedrals! Fairy cities fashioned with the most intricate artistry!—all gleaming with countless colors of celestial radiance!

But Bryce is only part of the picture. There is a trio of new wonderlands in Southern Utah—

Bryce Canyon-Cedar Breaks-Zion National Park

Season May 15 to October 15

Only a few have been there. It's still a frontier country but is now reached with all the comforts of modern travel. The Union Pacific has opened the way by providing sleeping car service, regular automobile tours over good roads and the latest style of National Park lodges and dining rooms.

Side trip may be arranged to the North Rim of Grand Canyon through the Kaibab Forest. The trip is a memorable vacation adventure in itself, or may be made in connection with tours to Salt Lake City, Yellowstone or the Pacific Coast. Ask about low round trip summer fares and personally escorted all-expense tours.

Send for Free Booklet in Natural Colors

It is the only way we can tell you of the unbelievable coloring of this unique land; also contains complete practical information.

THE COLOR PALETTE OF THE CONTINENT

Address nearest Union Pacific Representative, or General Passenger Agent at
Omaha, Neb. :-: Salt Lake City, Utah :-: Portland, Ore. :-: Los Angeles, Cal.

Union Pacific

In this month of gift choosing and giving—
See Eversharp and Wahl Pen

ALTHOUGH we look upon this as the month of May, nevertheless the harbingers of June are already present in the flowering of the early June brides.

This is a gift buying month!

Not only are the ministers active but even now the institutions of learning are loosing upon the world, the bold, masterful graduates and the sweet girl graduates.

When the invitation or announcement appears in your morning's mail, what do you expect to do?

Seriously, the best possible thing is to choose the nearest of the thirty thousand Eversharp dealers.

Go to his store.

Select an Eversharp, Wahl Pen, or an Eversharp, Wahl Pen Combination. Have the salesman put your purchase in one of those handsome silk-lined gift boxes—and everything is over but the pleasure.

You are justified in feeling perfectly satisfied with yourself. No one could have done better.

Eversharp and Wahl Pen are the products of the foremost manufacturer of fine writing equipment.

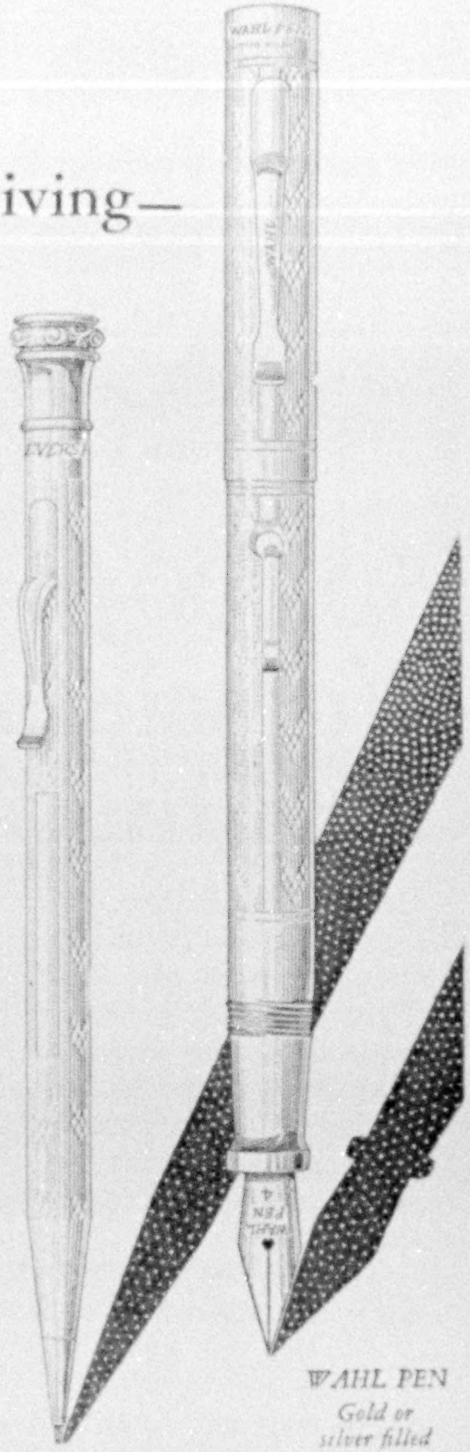
They have beauty to carry a heart full of sentiment.

They are useful, which signifies your thoughtfulness.

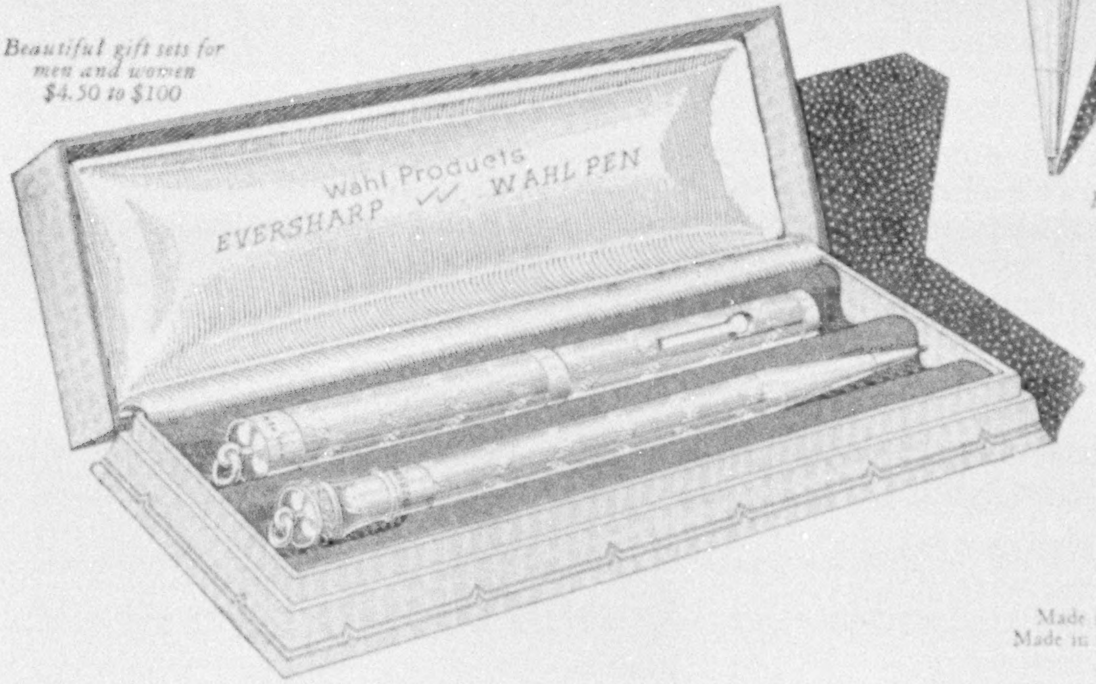
Their precious metal construction insures that they will wear well—for remembrance.

The qualities which have made Eversharp and Wahl Pen the world's standard writing instruments are the qualities that make them the first and best thought for all gift occasions.

Prices to suit your purse and the situation.



Beautiful gift sets for men and women $4.50 to $100



EVERSHARP
Models for every need
50¢ to $6
Also made in solid gold
This model $5

WAHL PEN
Gold or silver filled or sterling
$3 to $10
Also made in solid gold
This model $8

Wahl Eversharp and Wahl Pen
Made in U. S. A. by The Wahl Co., Chicago
Made in Canada by The Wahl Co., Ltd., Toronto
Prices same in Canada as U. S.

The New WAHL EVERSHARP PERFECTED and WAHL PEN

JOHN DAVEY
Father of Tree Surgery

$50,000 *per year* *for* scientific training alone

Davey Tree Surgeons are trained before they are permitted to enter the field force of the Davey Company. This training is never done on the trees or at the expense of the client. The Davey officials, who know Tree Surgery values, guarantee the ability and the reliability of the experts whom they send to treat your priceless trees.

The Davey Institute of Tree Surgery is maintained, at a cost of nearly $50,000 per year, to give scientific training to regular employes. It is open only to men already in the Davey organization; and all expenses are paid by the Company—in order that the service which you buy may be scientifically accurate and mechanically perfect.

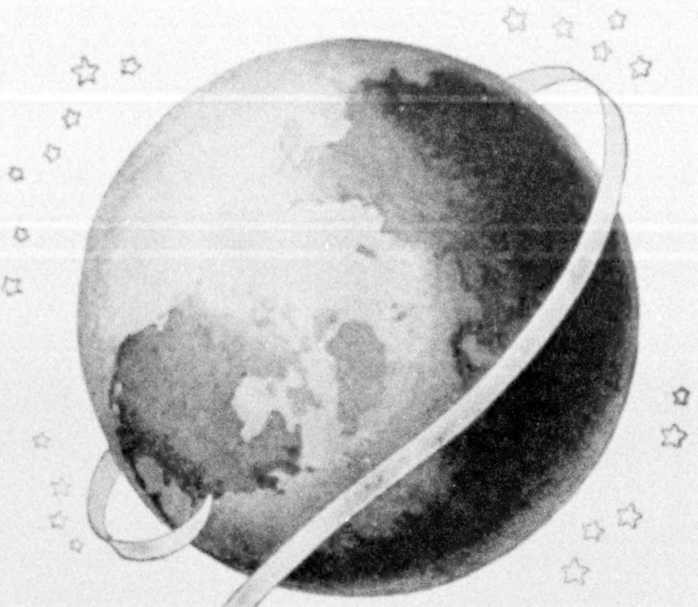
Davey Tree Surgeons are local to you—anywhere between Boston and Kansas City, between Canada and the Gulf. Write or wire Kent, Ohio.

THE DAVEY TREE EXPERT CO., INC.
148 City Bank Building, Kent, Ohio

Attach this coupon to your letterhead and mail today

THE DAVEY TREE EXPERT CO., Inc.
148 City Bank Bldg., Kent, Ohio

Gentlemen: Without cost or obligation on my part, please have your local representative examine my trees and advise me as to their condition and need.



Belgenland
WORLD CRUISE

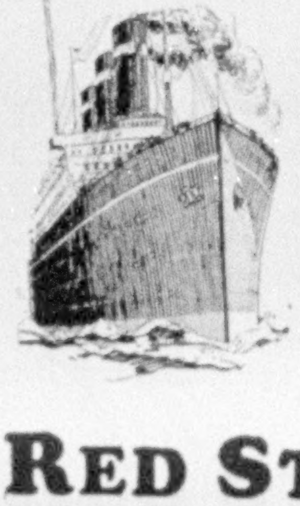
Largest and finest liner ever to circle the globe

Sailing westward in November on her second cruise around the world, this superb liner will visit 14 countries, arriving in each at the season best suited for travel there.

Journeys ashore under the skilled guidance of the American Express reveal the little-known charms of every country visited.

132 Days—60 Cities —14 Countries

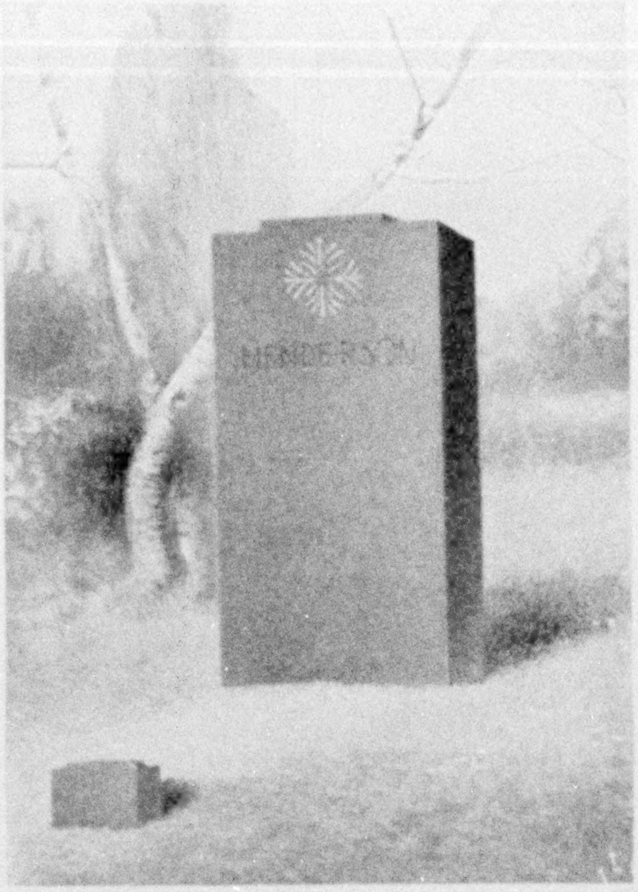
Sailing from NEW YORK Nov. 25, 1925
LOS ANGELES - - - Dec. 11
SAN FRANCISCO - - Dec. 14
Returning to NEW YORK April 6, 1926



The *Belgenland* is an ideal home for persons of cultivated tastes. She is a ship of sparkling personality—Continental in cuisine and service and in that indefinable thing called atmosphere.

Write for profusely illustrated booklet which answers every question on world cruises. Address Red Star Line, No. 1 Broadway, New York; American Express Company, 65 Broadway, New York, or other offices or agencies of either company.

RED STAR LINE
INTERNATIONAL MERCANTILE MARINE COMPANY
In Cooperation with
American Express Company



All the Warmth of Love is Typified in Rock of Ages Granite

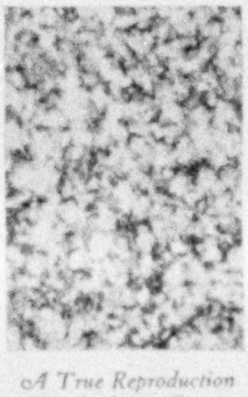
FOR the man or woman seeking an everlasting granite with which to build a memorial to the memory of a loved one, Rock of Ages is admirably suited.

Rock of Ages is not only the most permanent of quarry products, but its fine grain and natural blue-gray color reflect a radiant beauty, especially in polished finish.

Your family memorial, built in your own life-time of Rock of Ages granite, will endure to honor your name through the ages.

WHEN ordering a Rock of Ages monument from your local memorial merchant request our Certificate of Perfection. It is your guarantee of Rock of Ages—your protection against inferior substitutes.

Write today for Booklet "E"



A True Reproduction of Rock of Ages Granite

ROCK OF AGES

BOUTWELL, MILNE & VARNUM COMPANY

MONTPELIER, VERMONT

QUARRIERS—ROCK OF AGES GRANITE

QUARRIES AT BARRE, VERMONT

You take a Pullman when you travel, that you may arrive unruffled. You pack your clothes in an Oshkosh Wardrobe Trunk so that they may arrive the same way.

An attractive booklet describing Oshkosh Trunks will be sent you on request to 454 High Street, Oshkosh, Wisconsin.

OSHKOSH

THE OSHKOSH TRUNK COMPANY
Oshkosh, Wisconsin, and New York City

American Express

TOURS TO

Europe

(ESCORTED)

Planned and conducted by experts, these tours offer delightful summer trips abroad. Interesting itineraries varied as to time, places and costs.

Spring and Summer Tours to Europe, $1350 and up.

Special Summer Tours to Europe, $755 and up.

Six Weeks European Summer Vacation Tours, $673.

International Students' Tour to Europe, June 27th to August 31st, $793.

Holy Year Pilgrimages to Rome.

Limited Expense Tours to Europe on Tourist Cabin basis, $310 and up.

North Cape Cruise Tour—June, July.

SOUTH AMERICAN Summer Tours Sailing in July.

INDEPENDENT TOURS—to Europe at any time. All details arranged. Booklet.

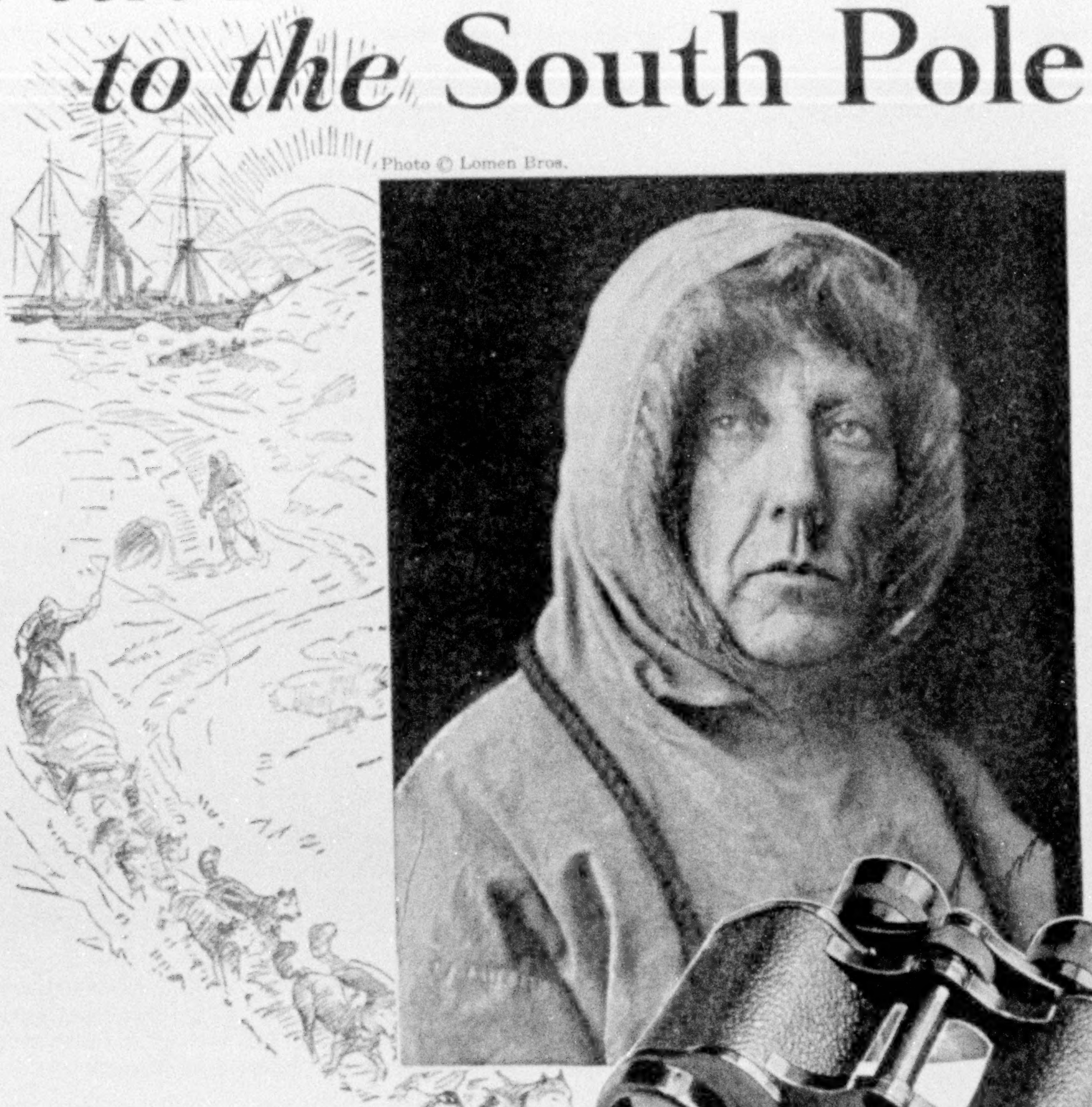
DOMESTIC TOURS—Escorted or independent—Alaska, National Parks, California, Saguenay, Bermuda. Booklet.

Information promptly given regarding these and many other tours. Write today for beautifully illustrated booklet "To Europe in 1925."

American Express
Travel Department
65 Broadway New York

With Amundsen *to the* South Pole!

Photo © Lomen Bros.



Mr. H. M. Bennett
U. S. Agt., Carl Zeiss

Dear Mr. Bennett:

My most prized possession is my Carl Zeiss Binocular, which is just as good today as when I bought it in 1902. It has been my constant companion on every trip for the past 22 years, including my trip to the South Pole. It has withstood every known climatic condition and very severe use. I do not hesitate to recommend Zeiss Binoculars most highly.

Roald Amundsen

The model used by Capt. Amundsen and 20 other models of 3 to 18 power are shown in our complete catalogue. Write for a copy.

Zeiss Binoculars are sold by leading opticians, camera and sporting goods dealers everywhere. Write for our complete catalogue.

HAROLD M. BENNETT, U. S. AGENT, 155 WEST 23RD ST., NEW YORK
Distributing Agents for Canada: The Hughes Owens Co., Ltd., Montreal, Toronto, Winnipeg, Ottawa

CARL ZEISS JENA

CARL ZEISS Prism Binoculars

Seattle

—Gateway to The Orient

TRANS-PACIFIC travelers mark as one of the high lights of their journey their visit to Seattle, Gateway or The Short Route to the Orient and America's chief port in commerce with Asia. Marshal Joffre said, "Seattle is, without doubt, the keystone of your western empire; I shall never forget it."

Seattle's picturesque setting, her glorious climate (summer average, 62 degrees), her interesting history, her cleanliness, her metropolitan aspect, her rapid but solid growth—these are a few of the things that make her a city of *unusual* interest.

Fifty years ago Seattle was an isolated wilderness hamlet with a handful of white men and women. Today Seattle is famous as a great world port. It is a magnificent metropolis of 400,000, terminus of four transcontinental railroads, financial, commercial, industrial and distributing center for the empire of the Pacific Northwest.

Many interesting and profitable days may be spent by the visitor in and about Seattle. As the Hub City of the renowned "Charmed Land," premier summer playground of America, Puget Sound offers endless variety of attraction for all ages. From surf bathing to climbing snow-clad peaks the range of entertainment is almost unbelievable. And her charms may be enjoyed either with or without physical exertion or departure from comfortable habits of living! Seattle ranks sixth in America in hotel facilities.

Write Room 104, Seattle Chamber of Commerce, Seattle, Washington, for free booklet describing Seattle and "The Charmed Land."

When planning ANY trip to the Pacific Coast, ANY TIME, insist that your ticket agent route you via SEATTLE. Liberal stop-overs allowed.

Seattle

Metropolis of

The Pacific Northwest

5 Great *New Ships*

TRANSYLVANIA CALEDONIA
CALIFORNIA TUSCANIA
CAMERONIA

Second to none in equipment and appointments for passenger comfort, these five new liners recently added to our New York-Londonderry-Glasgow Service form an important and outstanding feature of present day transatlantic travel; they make the old-established Route from

New York to SCOTLAND

and

North of Ireland

via Londonderry

a most desirable one for beginning and ending a European Tour, the most logical one for those traveling regularly to Scotland for business or pleasure.

To lovers of outdoor life few places offer the attractions of Scotland, with its bracing, ozone laden air, great moors, sparkling streams and gem-like lakes.

Links famous since the ancient game began await the golfer; splendid roads, revealing new vistas of scenic beauty at every turn; shooting and fishing afford exciting sport, while ancient castles and ivy-covered ruins enchant lovers of the romance with which Scottish history and literature is filled. Old time inns abound, with hearty welcome from genial hosts, and all the comforts of well-equipped hotels.

For literature and full particulars apply

ANCHOR LINE

25 Broadway New York

or Branches and Agencies

PACIFIC NORTHWEST

Business Men of America: Plan your Western visit so as to attend the great National Foreign Trade Convention in Seattle, June 24, 25 and 26

The Great Falls of the Yellowstone, Yellowstone National Park

Paradise Inn, Paradise Valley, Rainier National Park

© R. I. Gifford

Bring along your tackle!

Chalet group on St. Mary's Lake, Glacier National Park

The Columbia River Highway

Come to America's *great Summer Playland*

Sit down some quiet evening with "The American Wonderland" (it's yours for the asking), and let this entertaining travel book take you through the vacationland of your dreams.

Follow its absorbing pages into a realm of mountain loveliness—a vast profusion of snow-capped peaks, Alpine lakes, sunny ocean beaches, gleaming glaciers, forests, streams and tumbling waterfalls. A land where perfect summer days lure one to glorious sport—golf, horseback riding, surf bathing, mountain climbing, motoring, boating, fishing. A playland of charming cities and fine hotels.

So get acquainted with America's great summer playland—*then plan to see it and enjoy it yourself this summer.* Arrange a tour (we will gladly help you) that will include one or more of these great scenic features:

Glacier National Park
Yellowstone National Park
Rainier National Park
Crater Lake National Park
The Alaskan Tour

You can visit Glacier or Yellowstone on your way out or back. You can include the Puget Sound country, the famous Cody Road, the Oregon beach resorts, the Spokane country, the Columbia River drive—or any of hundreds of other fascinating vacation haunts.

Low round trip excursion rates this summer. Through trains providing service which anticipates your every travel wish. You can go one way and return another. (Through Scenic Colorado at no extra transportation cost.) Stop off where you wish along the way.

Mail the coupon now for the free book, "The American Wonderland."

The Chicago Burlington & Quincy R.R.
The Great Northern Ry.
The Northern Pacific Ry.

FREE TRAVEL BOOK

Travel Bureau, Dept. 27-F
Burlington Railroad Bldg.
Chicago, Ill.

Please send me without charge the illustrated book, "The American Wonderland."

Name..

Address..

Play Safe

with the money you carry in your pocket

More than a million people in the United States last year made over $300,000,000 of the money they carried about with them safe against loss or theft through the use of Travelers Cheques.

$30,000,000 of these cheques were used by *non-travelers* in the United States.

$150,000,000 were carried by tourists, motorists, and business men and women traveling in this country.

$120,000,000 were sold for use in travel abroad.

And this security cost a mere pittance compared with the comfort and the helpful personal service rendered through

AMERICAN EXPRESS
Travelers Cheques

The reason is plain why the great bulk—60%—of all travelers cheques sold last year were *used in the United States.* Lawlessness is not decreasing. Petty pilfering and banditry are exacting their appalling toll from those who carry "easy money"—traveler or non-traveler. Insured money in the pocket is as necessary on the streets of our cities as it is in traveling abroad. People are *playing safe* with their wallets. They are using travelers cheques.

AMERICAN EXPRESS TRAVELERS CHEQUES have a double insurance value. Not only do they protect actual funds wherever carried, but they insure the traveler against the many worries, uncertainties and misgivings that all people encounter when away from home.

At nearly 30,000 points in the United States are friendly offices manned by men trained to help those who carry American Express Travelers Cheques. No traveler need have any uncertainties in an express office, whether in Europe, South America, the Far East, *or in the United States.* "American Express," to its travelers cheque holders, is a byword of *personal service.*

Issued in $10, $20, $50, and $100 denominations. American Express Travelers Cheques cost only 75 cents per $100.

FOR SALE AT 22,000 BANKS
AND EXPRESS OFFICES

Secure your steamship tickets, hotel reservations and itineraries, or plan your cruise or tour through American Express Travel Department.

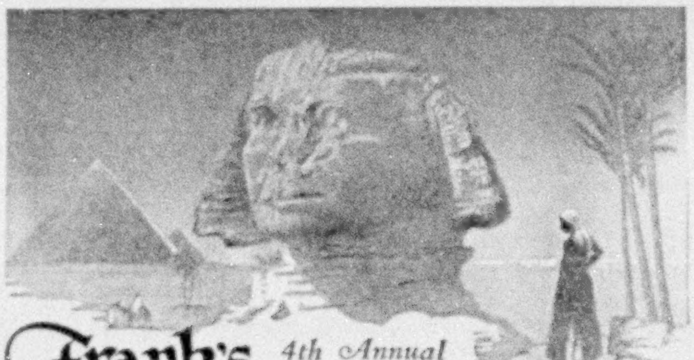
American Express Travelers Cheques

FLOWERS—to your Friends on outgoing steamers, to last all the way across.. For business openings, birthdays, receptions—to last a week. Flowers for every other occasion..

Write for Gift Catalog, illustrated in natural colors, and current price-list.

We deliver flowers in New York within 2 hours. In every other city in the world, able representatives to whom we transfer your order by wire or cable, fill it with scrupulous care in a few hours.

MAX SCHLING INC.
"THE Telegraph Florist of New York"
785 FIFTH AVE. at 60th St.
Telephone Regent 8060.



Frank's *4th Annual Cruise de Luxe*
TO THE **Mediterranean**

(Limited to 400 Guests—less than Half Capacity)
By Magnificent New 20,000-Ton Oil-Burning
Cunard S. S. "SCYTHIA"
Sailing January 26, 1926—67 Days

The Cruise of the "Scythia" has become an annual classic. In every respect it is unsurpassed.

Egypt—Palestine

Madeira, Spain, Gibraltar, Algiers, Tunis, Constantinople, Greece, Italy, Sicily, Riviera, Monte Carlo, France, England.

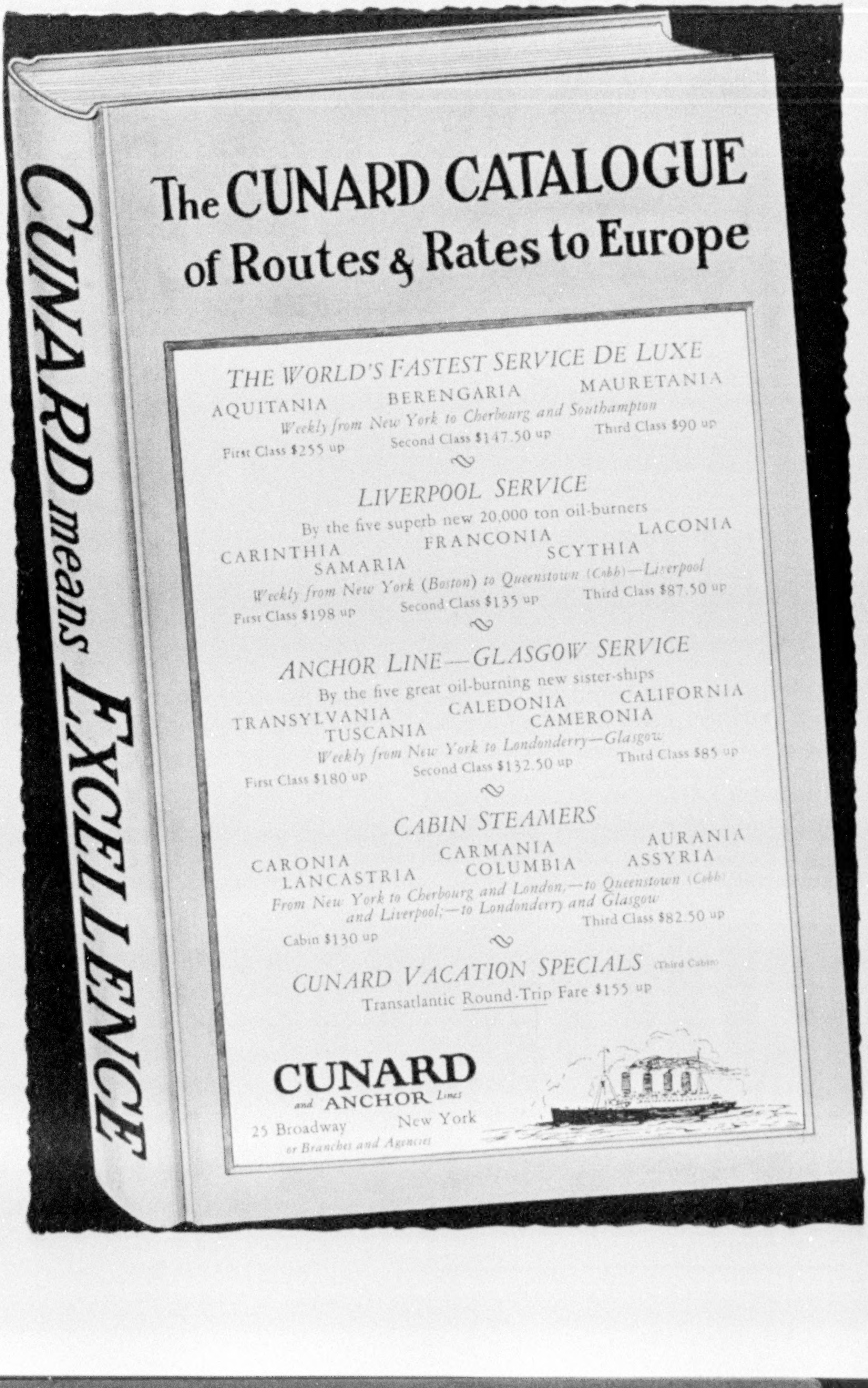
The "Scythia" is a floating palace, with spacious decks, lounges, veranda cafes, 2 elevators, gymnasium, commodious staterooms with running water and large wardrobes; bedrooms and suites with private baths. The famous Cunard cuisine and service. (Only one sitting for meals.)

Stop-over privilege in Europe without extra cost, returning via S. S. "Aquitania," "Mauretania," "Berengaria," or any Cunard Line Steamer.

Early reservation insures choice of location.

Also EUROPEAN TOURS—Frequent Departures

FRANK TOURIST CO.
542 Fifth Avenue, New York
At Bank of America, Los Angeles. 582 Market St., San Francisco
219 So. 15th St., Philadelphia
(Est. 1875) Paris Cairo London


CUNARD means EXCELLENCE
The CUNARD CATALOGUE of Routes & Rates to Europe
THE WORLD'S FASTEST SERVICE DE LUXE
AQUITANIA BERENGARIA MAURETANIA
Weekly from New York to Cherbourg and Southampton
First Class $255 up Second Class $147.50 up Third Class $90 up
LIVERPOOL SERVICE
By the five superb new 20,000 ton oil-burners
CARINTHIA FRANCONIA LACONIA SAMARIA SCYTHIA
Weekly from New York (Boston) to Queenstown (Cobh)—Liverpool
First Class $198 up Second Class $135 up Third Class $87.50 up
ANCHOR LINE—GLASGOW SERVICE
By the five great oil-burning new sister-ships
TRANSYLVANIA CALEDONIA CALIFORNIA TUSCANIA CAMERONIA
Weekly from New York to Londonderry—Glasgow
First Class $180 up Second Class $132.50 up Third Class $85 up
CABIN STEAMERS
CARONIA CARMANIA AURANIA LANCASTRIA COLUMBIA ASSYRIA
From New York to Cherbourg and London,—to Queenstown (Cobh) and Liverpool;—to Londonderry and Glasgow
Cabin $130 up Third Class $82.50 up
CUNARD VACATION SPECIALS (Third Cabin)
Transatlantic Round-Trip Fare $155 up
CUNARD and ANCHOR Lines
25 Broadway New York
or Branches and Agencies

XUM

Golden days of new adventures

Mission Dolores, San Francisco

A TREASURE-TROVE of vacation plans and trips—a picturization of America's greatest vacation adventures—that's the booklet, "California Wonder Tours," which we will send free. Whether you come to California this year or later it's a booklet you will enjoy reading and ought to have.

Fascinating San Francisco, America's coolest summer city—the golden gateway to Hawaii and the Orient—with its bay and ocean and picturesque waterfront, is your natural starting point for these tours, which include Yosemite and three other national parks; Lake Tahoe, Mt. Shasta, Mt. St. Helena and Clear Lake, the Redwood Highway, the boiling geysers, the jagged Pinnacles, the Spanish Missions, including Mission Dolores in San Francisco, established 1776; and a thousand other interesting points. Practically all of them are within a day's ride from San Francisco by motor car or train. Other shorter trips from San Francisco take you to Mt. Tamalpais over the crookedest railroad in the world, to Mt. Hamilton Observatory, to Monterey Bay and equally interesting places. Ocean fishing, sailing, bathing—every form of diversion is here. Low round-trip summer fares. Send coupon now to CALIFORNIANS INC. for the free booklet and learn how to get the most and see the most for your vacation fund.

Californians Inc.

Headquarters, San Francisco

140 Montgomery Street, Room 500 B

Please send me the booklet

"California Wonder Tours"

Name ____________________

St. and Address ____________________

Hawaii

for COOL Summer Play

Decide now to surf, swim, play and rest along Hawaiian beaches in June, July and August. To taste tropic fruits at their best—to see the gorgeous flowering trees—to golf on the 4 principal Islands.

5 Ports to Paradise

It's an easy trip. You may book from your home town direct, via San Francisco, Los Angeles, Seattle, Vancouver or Victoria, B. C., making round trip from the Coast in 3 or 4 weeks.

For $300 to $400

—you can enjoy a week or two in this exotic Territory of the United States. That sum covers round-trip steamer fare and all other travel, hotel and sight-seeing costs, including visit to volcanic wonders of Hawaii National Park and cruises among Islands. You'll want to stay longer, and that also will be easy. Hotel, apartment and cottage rates are moderate.

Summer—Cool

Trade-winds from the Arctic keep Hawaii cool. Highest temperature last summer in Honolulu (U. S. Weather Bureau, August 23, 1924) was 84.7°. You'll sleep under covers every night. Ask your nearest railway, steamship or travel agent for data on that trip. For colored, illustrated brochure, WRITE NOW—

HAWAII TOURIST BUREAU

212 MONADNOCK BLDG., SAN FRANCISCO

or 341 FORT STREET, HONOLULU, HAWAII, U. S. A

see something new this summer

Off the beaten path

the Arizona *and* New Mexico Rockies - a region *of* scenic surprises - high mountains, great pine forests, colorful canyons, interesting Indians - a land *and a* people entirely unfamiliar to you. Trips by saddle and pack or auto—

Santa Fe picture-folders tell where and how—

daily Santa Fe Summer

Xcursions

Low fares also to *California Colorado* and the National Parks

mail this

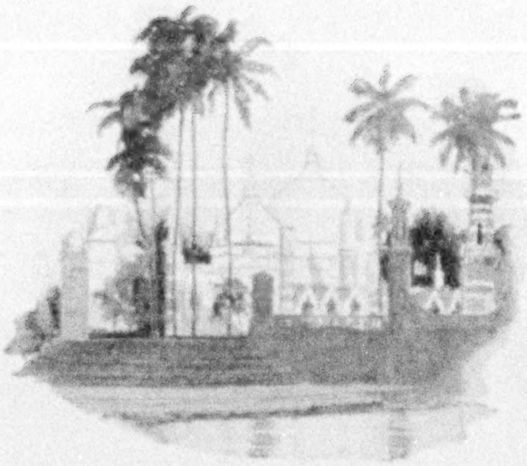
W. J. Black, Passenger Traffic Manager, Santa Fe System Lines
1212 Railway Exchange, Chicago, Illinois
Please send me Santa Fe picture-folders of trip to

....

and details as to cost

....

XUM



World Cruises

Bring into your life strange peoples, gorgeous beauties, rare charm — a great adventure

Travel is a liberal education. Hawaii is beautiful beyond description. Japan promises delightful adventure. Great cities as modern as our own and strange customs that date back centuries.

Shanghai and Hongkong lead into crowded China. Wander through the interior or visit only the larger ports.

Malaya, Ceylon, India — all names that inspire famous story-tellers. They are colorful. Shop there for ivories, batiks, silks, precious stones — treasure-hunting days in quaint shops.

Egypt, the Holy Land, Italy and France are beyond.

One can make this *trip of all trips* in real comfort amid luxurious accommodations. Palatial President Liners circle the globe in 110 days with sailings every fortnight. You go all the way on Dollar Liners.

They are magnificent oil-burners, manned by a thoroughly trained personnel. An excellent cuisine and large, commodious rooms.

Yet the trip is not costly. You may go Round the World in first-cabin accommodations at a fare well within your means. This includes meals and berth aboard ship.

You visit 21 world ports with stopovers at each.

Plan now to go. Receive complete information. Delay no longer taking the one trip of keenest interest and truest value.

15 Moore Street, New York City
29 Nanking Rd., Shanghai
Hongkong and Shanghai Bank Bldg., Hongkong
24 Calle David, Manila

Hugh Mackenzie, G. P. A.
311 California Street, Department M 705
San Francisco, California

DOLLAR STEAMSHIP LINE

SPECIALISTS IN SAFETY

FOR 43 years, S. W. STRAUS & CO. have been specialists in safety. Straus Bonds not only are safe, but they yield an attractive interest rate — 6% or even better — and have a marketability ample for the purposes of most investors. Investigate these sound bonds. Write today for

BOOKLET E-1508

S.W. STRAUS & CO.

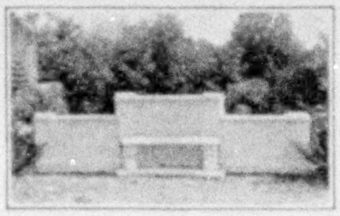
Established 1882 • Investment Bonds • Incorporated

STRAUS BUILDING
505 Fifth Avenue at 46th St.
NEW YORK

STRAUS BUILDING
Michigan Avenue at Jackson Blvd.
CHICAGO

43 YEARS WITHOUT LOSS TO ANY INVESTOR

© 1925—S. W. S. & Co., Inc.



HARRISON MEMORIALS

The memorial you select should reflect individuality, good taste and embody excellence of material and workmanship.

Write for Booklet "C"

HARRISON GRANITE COMPANY, Inc.
Established 1845
4 East 43rd Street At Fifth Avenue New York, N. Y.
Offices: Detroit Chicago Pittsburgh Minneapolis
Works: Barre, Vermont

Bind Your Geographics

Bind your Geographics for all time with beautiful two-tone embossed leather-cloth Molloy Made Geographic Covers—splendid, permanent volumes for your library. Punch and instructions with each cover enable you to bind them yourself easily and without sewing or gluing. Specify volume and year desired. Years from 1910 to 1925 now ready. Each cover holds six numbers. $2 each or $3.65 a pair. Satisfaction guaranteed.

THE DAVID J. MOLLOY COMPANY
2863 North Western Avenue, Chicago, Illinois

Start May First

LAST year two and a half million babies were born in the United States—our future citizens—the men and women who are to be entrusted with the affairs of tomorrow. Precious as these little lives were, not only to their parents but to the country itself, *one* out of every *thirteen* died before its first birthday.

This tragic waste of human material must be checked. A plan is under way to bring this about. Every mother and father, everyone in America who loves children and his country, is asked to help.

May Day, which has always been one of the banner days of childhood with its picnics and its gayly-ribboned May-poles will hereafter be known as National Child Health Day.

May-Poles—Symbols of Health

When you see the May-poles, think of them as symbols of sound health for children.

All over the country members of religious, business, fraternal, patriotic, labor and other organizations are working to make Child Health Day a success.

There will be celebrations and festivals, public gatherings and speech making. Stores from coast to coast will have special window displays calling attention to Child Health Day. Business concerns, mills and factories will have important health demonstrations.

The men and women who are working for an improvement in child-health are taking steps to safeguard the right of every child to reach maturity in good condition physically, mentally and morally.

Find out what your community is doing to celebrate May Day. Let's not have a slacker town or city in all the country.

Herbert Hoover's Plea

The purpose of the May Day Celebration is to focus attention upon our most precious national asset—our children * * *

The ideal to which we should drive is that there should be no child in America that has not been born under proper conditions, that does not live in hygienic surroundings, that ever suffers from undernutrition, that does not have prompt and efficient medical attention and inspection, that does not receive primary instruction in the elements of hygiene and good health.

It is for the reiteration of this truth, for the celebration of it until it shall have become a living fact, that we urge all people of good will to join in the celebration of May Day as Child Health Day

Herbert Hoover.

Every Home a Health Center

Have your boys and girls physically examined at least once a year. See that they eat the right body-building food. Make certain that they play every day in the fresh air, sleep long hours with open windows and establish healthy body-habits. Give them buoyant, joyous health. Endow them with strong, sturdy bodies.

But remember that the dreams you dream on May First and the plans you make must be carried out every day in the year to give your children the best possible chance in life.

There are upward of 35 million children in the United States who are subject to dangers in many communities by failure of community safeguards. In some sections of the country impure water and impure milk are supplied. In other communities inadequate provisions for health inspection are made. Again, too few playgrounds are opened or too many children are permitted by law to be at work in factories when they should be in school.

Six countries have lower infant mortality rates than the United States. There are many countries which lose fewer mothers in childbirth.

We need more prenatal and maternity care and instruction; closer supervision of health in schools; nutrition classes; more playgrounds and a wider system of public health measures.

The New May Day brings a plea for safeguarding the welfare of our children. The Metropolitan Life Insurance Company has published a booklet, "The Child," which is a guide and help to mothers. It will be mailed free, to any one who asks for it, together with a Child Health Day program prepared by the American Child Health Association.

HALEY FISKE, *President.*

Published by

METROPOLITAN LIFE INSURANCE COMPANY—NEW YORK

Biggest in the World, More Assets, More Policyholders, More Insurance in force, More new Insurance each year

AMERICA'S MOST FAMOUS BOX OF CANDY!

STEPHEN F. WHITMAN & SON, Inc., Philadelphia, U. S. A.

Sole makers of Whitman's Instantaneous Chocolate, Cocoa and Marshmallow Whip

Vol. XLVII, No. 5 WASHINGTON May, 1925

THE NATIONAL GEOGRAPHIC MAGAZINE

COPYRIGHT, 1925, BY NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON, D. C., IN THE UNITED STATES AND GREAT BRITAIN

THROUGH THE BACK DOORS OF BELGIUM

Artist and Author Paddle for Three Weeks Along 200 Miles of Low-Countries Canals in a Canadian Canoe

By Melville Chater

Author of "Through the Back Doors of France," "Zigzagging Through Sicily," and "The Land of the Stalking Death," in the National Geographic Magazine

AT LAST a tourist-glutted train disgorged us into the four-o'clock gray of a Paris dawn. Street flushers were hosing the pavement, revelers were taxiing homeward under the extinguished lamps, and week-end fishing-parties were snatching snacks at an all-night coffeehouse — a haven which sheltered us till sunrise.

With that dawn began the hectic week of two Americans who, in addition to seeing the Olympic sports, were trying to catch up with Paris after several years' absence.

But Paris will not tire first at that game. One day, as we sat down, exhausted, on our trunks in a storage warehouse, something suspended by ropes from the ceiling inspired us simultaneously with the same idea. The thing was the 16-foot canoe in which we had crossed Brittany in 1922,* and the idea ran, "Let's drop out of this rush and roar. Back to the Back Doors Country!"

Verily, once you have tasted the delights of back-doors travel, the luxurious welcome along established tourist routes will serve only to wake in you a homesickness for that vagabond realm where footpaths and canals take the place of railways and rivers, where Europe's omnipresent "Hôtel Splendide" dwindles into "The Fisherman's Inn," and where your information is gleaned, not through smartly uniformed guides, but through bargees, haystack sleepers, and wandering artists.

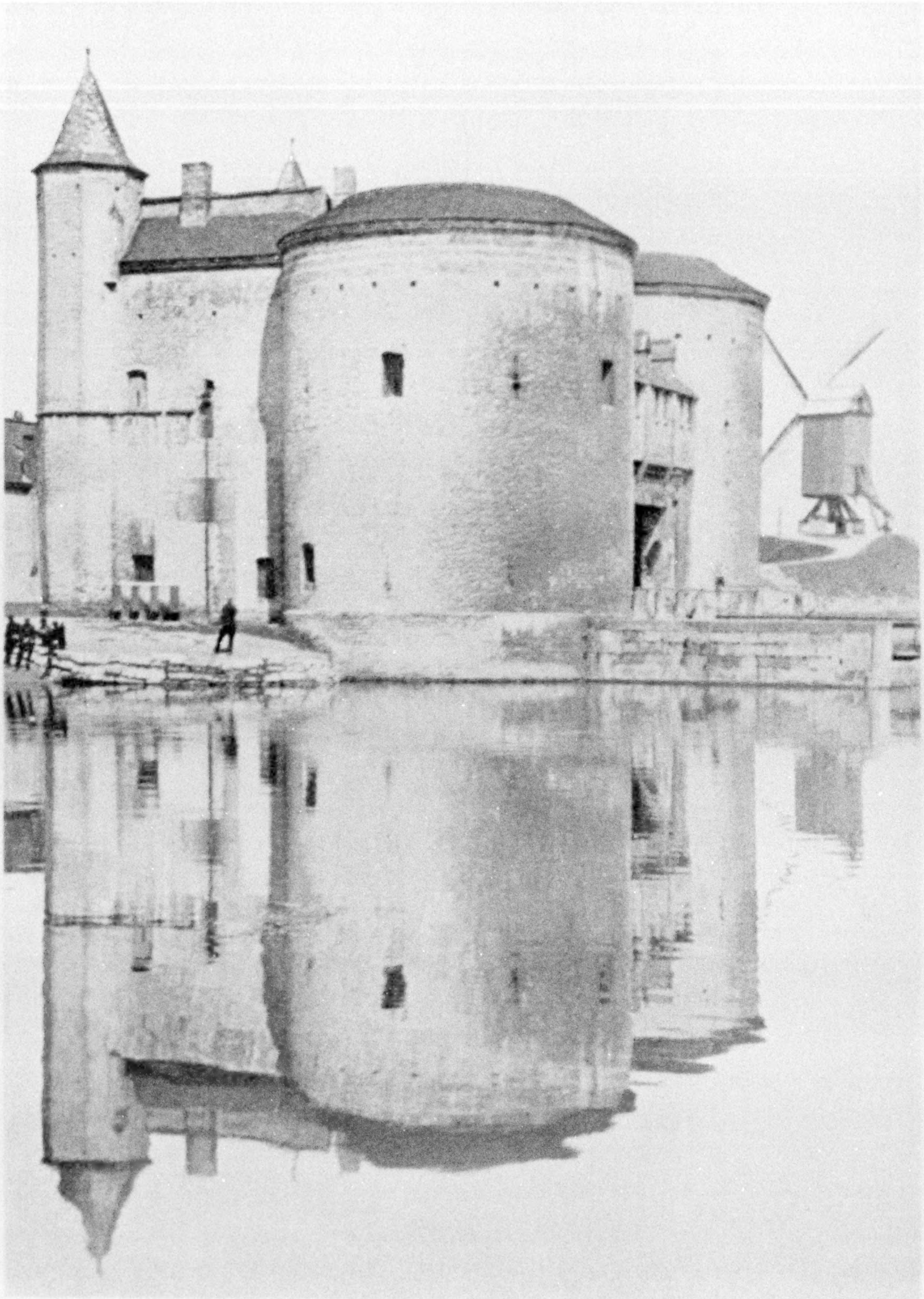
For of such is the Back Doors Country.

Belgium having been decided upon, we played luck against ignorance in the matter of a starting point by drawing lots, the slip drawn exhibiting the word "Bruges." Within 48 hours we were en route for Flanders, with our canoe, the *Nageoma*, a day ahead of us on the *grande vitesse*.

NO STRAIGHTAWAY JOURNEY IN BELGIUM IS OVER 175 MILES

Along the Paris-to-Bruges line no customhouse is needed to inform you that you have crossed the border. Though war's lightnings still revealed their passage amid Nature's cemeteries of blasted tree-trunks, underfoot lay the Low Countries' infinitude of green flatness, where flying miles of sugar beetroot, plotted as neatly as squares in a crossword puzzle, spelled intensive cultivation in seven letters—Belgium.

* See "Through the Back Doors of France: a Seven Weeks' Voyage Through Brittany and the Château Country," by Melville Chater, in the National Geographic Magazine for July, 1923.



Photograph by Alexander Stewart

THE HOLY CROSS GATE: BRUGES

Bruges, of all Belgian cities, has best preserved its medieval characteristics. Though its old town wall was razed in the 19th century on account of modern traffic conditions, the four town gates still remain to aid in perpetuation of the "canal-reflected dream of gabled roofs, carved cornices, and little quay-to-quay bridges" (see text, page 501). The Holy Cross Gate dates from the 13th century.

Photograph by Emil P. Albrecht

A MARKET PLACE IN BRUGES

In the left foreground is a milkmaid, with her pails suspended from a yoke.

Industry, alike in field and factory, is the keynote of this amazingly compact little country. One-third larger than Massachusetts and with nearly twice the population, Belgium, with its 7,500,000 people, is the most densely settled State in Europe.

So inconsiderable are distances in Belgium that you cannot take a longer straightaway jaunt than 175 miles without spilling over into Holland or falling into the English Channel. Yet the little kingdom's four-acre farms produce per year a total products value of 5,000,000 francs, while the annual value of its manufactures exceeds the billion-franc mark.

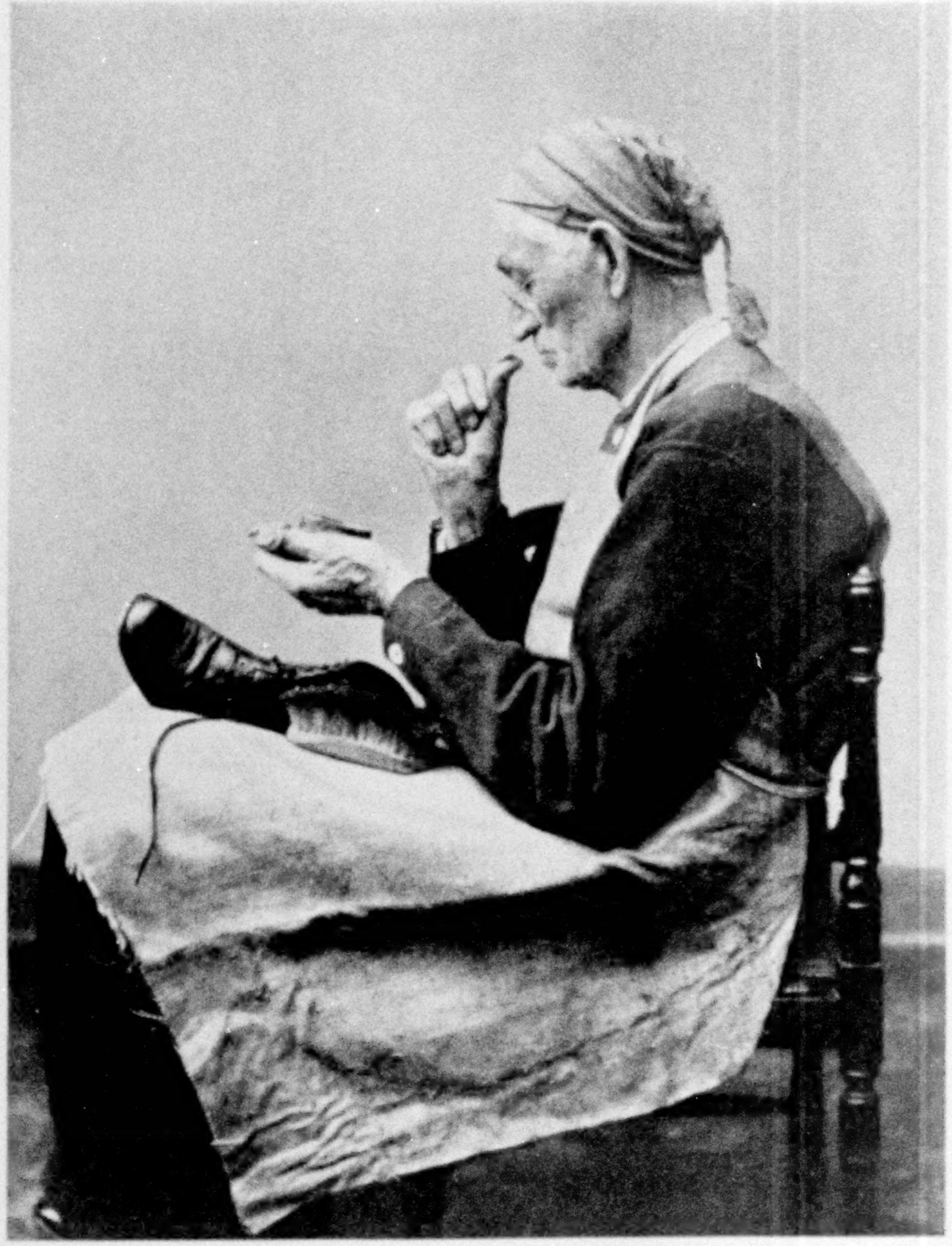
BRUGES CELEBRATES THE NATIONAL HOLIDAY

The canal-reflected dream of gabled roofs, carved cornices, fortresslike city gates, and little quay-to-quay bridges, which is Bruges, welcomed us from the Grand' Place with an air-tingling succession of early Flemish tunes, flung abroad by 49 bronze tongues in the old, brown Belfry.

It was the night of the national holiday. Throngs of sight-seers were packing the hotels, and we were well content to find furnished rooms on the Belfry square. Dinner over, we hurried with all the world through tortuous streets to the Quai Long, where a water festival was in progress.

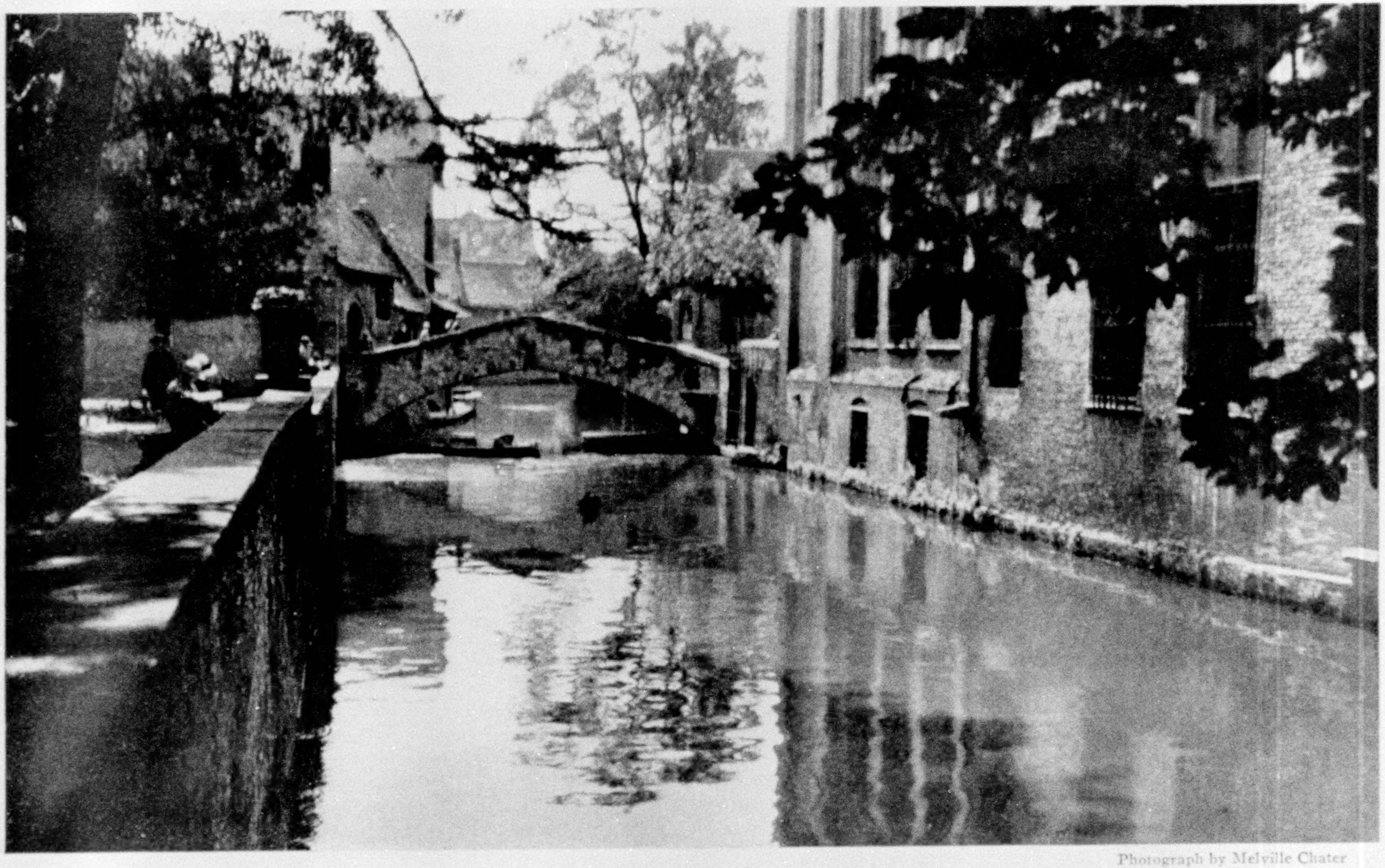
Down the lamp-festooned canal slowly slid a procession of great barges, carpeted, flanked with bay trees, and bearing pageant groups. Bruges' museums had been ransacked for arms and costumes to make the Middle Ages breathe again. Here was Duke Philip, founding the Order of the Golden Fleece. There were Bruges' city fathers renewing the rights of the Hanseatic League. Now, stretched effigylike on a valanced bed, attended by guards and in court costume, lay Mary of Burgundy beside the Duke of Bavaria—proxy bridegroom for the Archduke Maximilian—with a naked sword dividing them. And now a Flemish wedding feast, with goblet-quaffing guests at table and with flutist and violinist performing 16th-century airs, floated past.

A FLEMISH PEASANT CUTTING BREAD



A BELGIAN SHOEMAKER PAUSES TO TAKE A PINCH OF SNUFF

Photographs by Gevaert



Photograph by Melville Chater

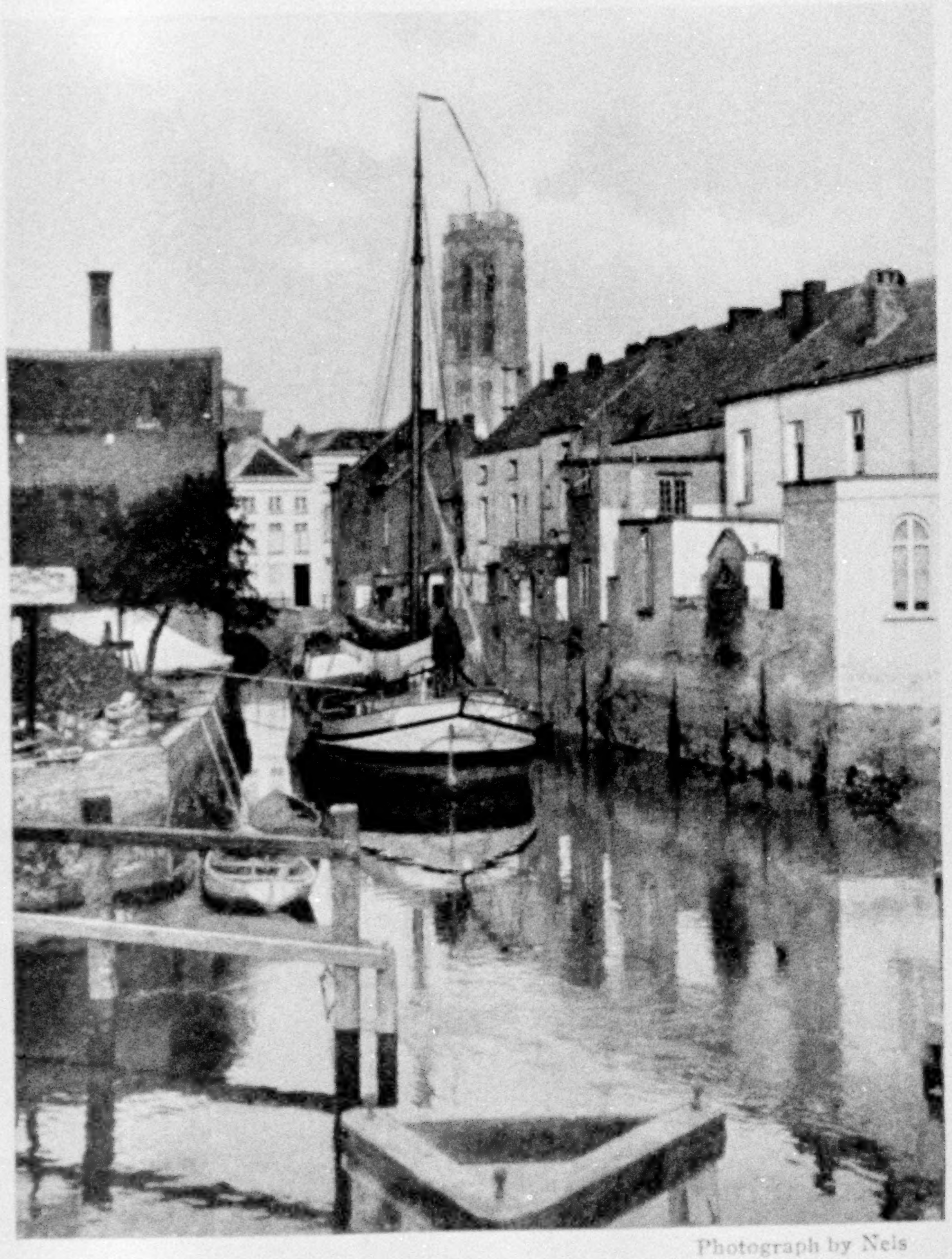
A BIT OF BELGIC VENICE

Bruges derives its name from the many bridges over its canals. It is known as the Venice of the North, its numerous waterways connecting it with Ghent and other inland cities. Bruges was one of the great commercial centers of Europe until its access to the sea was stopped by the silting up of the Zwyn, which was complete by the year 1490.

Photograph by Emil P. Albrecht

THE BRIDGE LEADING TO THE ENTRANCE TO THE BÉGUINAGE OF BRUGES

The name of this order is supposed to be derived from a priest of Liége, Le Bègue, who founded the first Béguinage (Flemish, Begynhof) in 1180. There are about 20 Béguinages in Belgium and one each in Amsterdam and Breda, in Holland; the total number of Béguines is about 1,500. This Bruges Béguinage was founded in the 13th century, but the gateway dates only from 1776.



Photograph by Nels

ST. ROMBOLD'S TOWER, MECHLIN, FROM THE DYLE RIVER

This 15th-century Belfry was originally designed to be the highest in Christendom (see text, page 512). Its carillon is one of the finest in the world.

Photograph by Melville Chater

THE VILLAGE MERCATOR PUT ON THE MAP

Beside the church stands the statue which Rupelmonde has erected to the memory of her most distinguished son, the cartographer who devised the "Mercator projection" (see text, page 521).

Photograph by E. Sacré

BÉGUINES OF GHENT

The order of Béguines is composed of unmarried women of unblemished character; it is devoted steadfastly to the "support of the needy and the care of the sick." The novices and younger sisters dwell in a convent, occupied with sewing, lace-making, and instruction in nursing, as well as their devotional exercises, but the elder sisters reside in small houses grouped about a great tree-shaded court, and give their time to nursing, teaching the poor, and caring for needy children. Although their vows are not irrevocable, few leave the order (see also page 518).

My friend, who is a painter, ejaculated, "Frans Hals!" and groaned for palette and sunlight to reproduce what indeed seemed a living picture gallery of old Flemish masters.

The rich spectacle dwindled into a tail-piece of patriotic floats and red fire, while from under the canal-flanking line of 16th-century gables the spectators chanted *La Brabançonne,* and widespread drinking houses flung their lights across the cobbled quay, where huge bargees waltzed with waxen-faced girls, chorusing in broad Flemish that, yes, they had no bananas to-day!

SHOPPING FOR THE CANOE JOURNEY

Next morning, upon receipt of an arrival notice from the railway, we began ransacking the shops for the *Nageoma's* camping equipment. Incidentally we came across a map of Bruges showing its spider's-web arrangement of canals, the largest of which inclosed the town in a great circle, with a branch showing us the way to Ghent.

"Why not buy it?" suggested my friend.

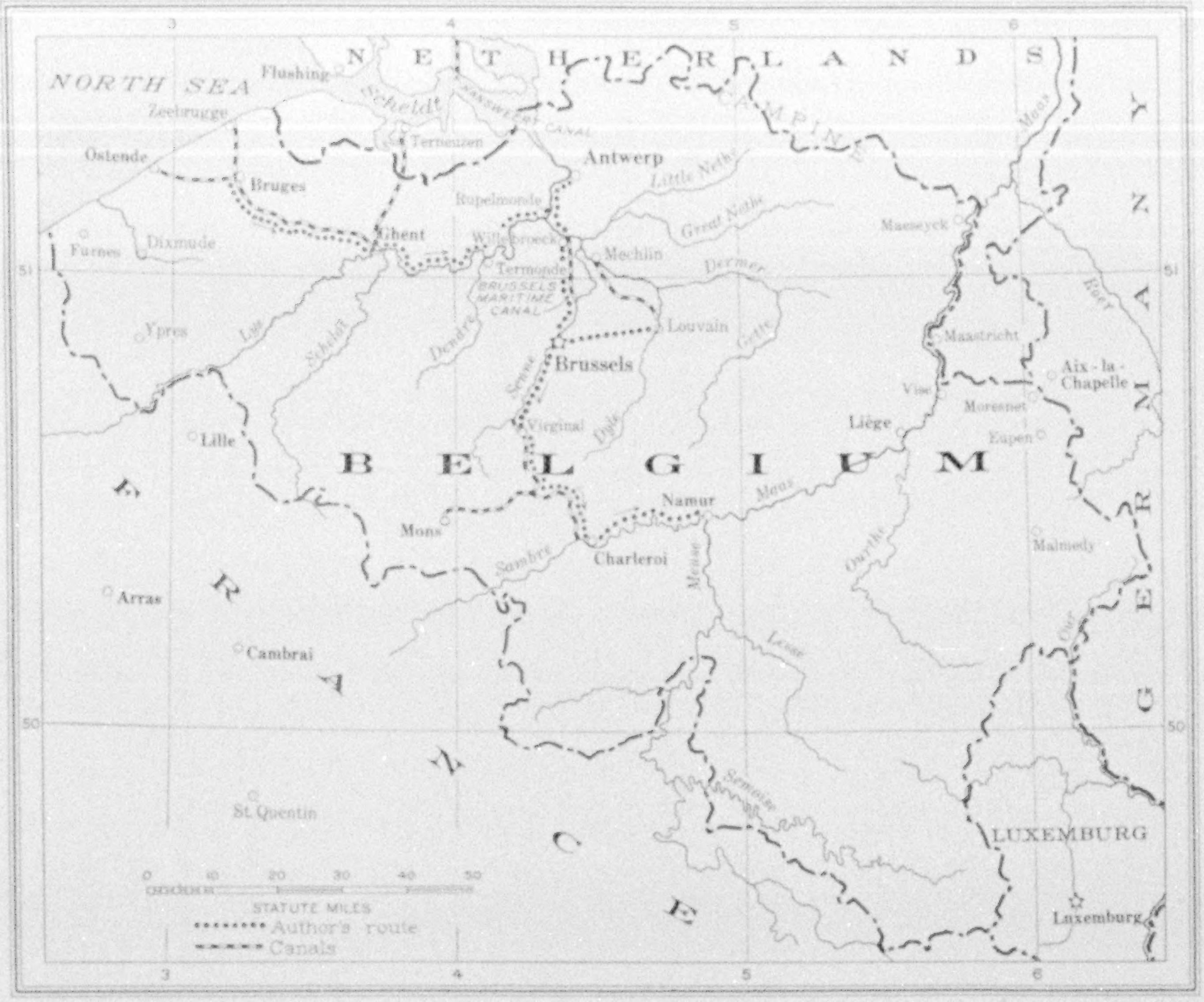
"Buy a map?" I returned with scorn. "Whoever heard of losing one's way on a canal?"

Seated atop of our piled-up luggage, we drove from the Belfry square across town to the customhouse. Around a freight car stood a group of freight handlers, curiously regarding the *Nageoma.* They were agreeing that it was certainly too tippy to fish from, and that the absence of motor and sails proved that it was no pleasure craft.

"What do you do with it?" inquired one of them.

"We're going traveling in it," I replied carelessly, getting out the paddles.

"What, with those match sticks?" and, "How far?" came the questions.



Drawn by A. H. Bumstead

A MAP OF BELGIUM SHOWING THE ROUTE OF THE "NAGEOMA"

The 200-mile voyage of the Canadian canoe began at Bruges and included among its ports of call Ghent, Rupelmonde, Termonde, Antwerp, Willebroeck, Brussels, Charleroi, and Namur.

"Oh, just across Belgium, for the present."

At this they stared at each other, and one of them made measurements on a map to prove that it was a matter of 300 kilometers. And, quite unmoved, we replied, "Even so!"

But who would want to go such a distance, and in such a manner, for mere pleasure? That was the question their mystified glances exchanged back and forth.

As we departed canalward with the canoe on a hand truck, I heard one of them announce, "I have it! They are professional oarsmen, training for the Olympic games!"

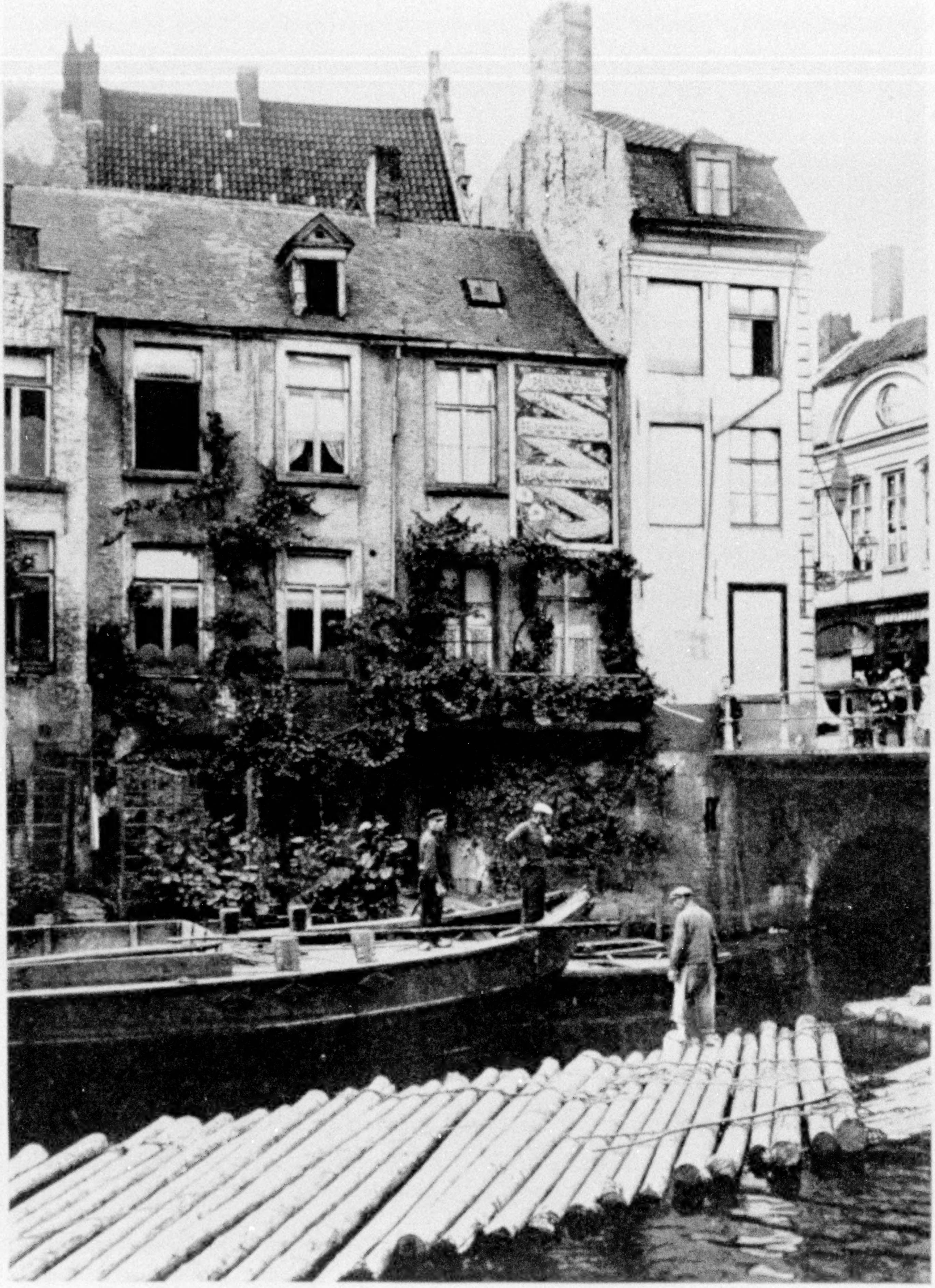
ALL ABOARD FOR GHENT IN A LEAKY CANOE

We launched—and instantly the *Nageoma* developed leaks. "She's dried out, needs water," said my friend cheerily. "All aboard for Ghent and all way stations!"

The sylvan canal curved away, curved beautifully, all that afternoon. Ghent did not appear, but we bucked our failing energies with the reflection that we loved curving canals—while a bit longer, they were so much more picturesque than straight ones!

Meanwhile the leaks increased, and my friend, oblivious of the ominously blackening clouds, kept murmuring blithely, "Water, all she needs is water!" And suddenly the water came, a deluge of it, poured from split skies into an open canoe, drenching us to the skin.

"There, I hope you're satisfied!" I said, with the indignant feeling that somehow his cackle about needing water had brought on the storm. "And when *does* this curve come to an end?"



Photograph by Topical Press Agency

TRAFFIC CONGESTION ON THE RIVER LYS AT GHENT

At the right is the end of the Bridge of Butchers, leading to the Place Sainte Pharaïlde, for three centuries the scene of public executions. Members of the Ghent Guild of Butchers were known as the Prince's Children, being descended from Charles V and the pretty daughter of a butcher, who obtained for her son and his heirs the sole right of slaughtering and selling meat in the city.

Photograph by Melville Chater

GHENT'S CELEBRATION OF THE 300TH ANNIVERSARY OF ST. MICHAEL'S GUILD

The front group represents the St. Joris Guild (crossbowmen, founded in 1300). Following in order are representatives of St. Sebastian's Guild (longbow, founded in 1360), St. Antoine's Guild (firearms and cannon, founded in 1450), and St. Michael's Guild (fencing, founded in 1613).

It may have been an hour later, and the darkness had certainly deepened toward dinnertime, when my friend sang out from the bow, "Lights ahead! Ghent at last!"

THE CURVING CANAL PLAYS A MEAN TRICK ON THE CANOEISTS

We jumped ashore, overturned the canoe on the bank, threw our drenched effects upon a passing hand truck and cried cheerily, "Boy, the nearest hotel!" Yes, there's a great satisfaction after the day's paddle, wet, cold, and weary though you may be, to know you've made the town you set out for.

"We've gone a good 20 kilometers," I announced, as we trudged through a maze of dark back streets.

"Thirty at least!" insisted my friend, feeling his trusty biceps.

Then suddenly—we had entered a large square—we halted to stare blankly about at our surroundings and at each other. A sickly feeling seized me.

"Ghent?" I asked the boy.

"No, Bruges!" he responded calmly.

We tried to argue him out of it, but it was no use. He insisted that he had been born there. Then my friend turned upon me and said rudely, in the tone that an urchin uses to address a stalled motor car, "Get a map!"

In fact, we had followed Bruges' encircling canal all around the town's outskirts and had turned up opposite our lodgings on the Belfry square.

HOW A FAITHFUL MOTHER, THOUGH DEAD, WATCHES FOR HER BOY

After a day's drying-out we made a fresh start, gaining the canal side through the "Street of Geese," where the old, white-capped lacemakers who sat in the sun, manipulating their bobbins, informed us that the crowd of local couples who had been promenading the night before in our strange craft had expressed a hope that we might settle in their midst and rent it out by the hour.

Photograph by Warren R. Laity

ALONG THE QUAYS OF GHENT

As we glided past a fork in the canal, we spied the figure of an old crone who seemed to watch us from an abutting window. "Is this the way to Ghent?" we called. But the figure remained mute. Then we drew near and discovered that it was merely a carved effigy, dressed in peasants' clothes. This is the way a neighbor explained it:

"It's Jules' mother. In 1914 Jules marched off to Liége with the rest, and his old, lame mother promised him she'd be watching at the window when he returned. Soon Jules was reported missing, but the old woman always believed that he was still alive. When she got bedridden, she had that figure set there in her place. And now she's dead, and Jules is still missing, but there she is, still facing in the direction of Liége."

It needs the poignant pen of a Daudet to enshrine that unchronicled statue of an unknown war mother who kept the faith.

By noon we were well into what the French call "little country," gliding along between Flanders fields where cornflowers, frayed into a curious resemblance to the Iron Cross, mingled with the poppies, and where avenues of poplars and rows of cornstalks constituted Belgium's regiments of peace.

THE ARRIVAL IN "EIGHT-O'CLOCK TOWN"

Then came Eight-o'clock Town. Across the canal's darkening mirror we glimpsed the red roofs of its midget houses, low-doored and green-shuttered, clumped about a gigantic windmill on a green ridge where belled cows tinkled homeward against the last light streaks of the western sky. We went ashore. Two rows of dolls' houses, fast-shuttered, a sleeping tobacco shop, a deserted dramhouse, a lantern light on the quaint canal bridge, and over all the peace of a Dutch etching. Not a face, not a sound save that of belled cattle settling in their stalls. And we named it Eight-o'clock Town, and said that it was the capital of the Back Doors Country.

To have roused this twilit idyl with cries of hunger, we felt, would have been nearly as sacrilegious as shouting "Pork and beans!" in Gray's elegized country churchyard. So we dined on canned goods, then stretched the *Nagcoma's* rod-supported tent from stem to stern, laid

Photograph by Emil P. Albrecht

OLD GUILD HOUSES ON THE QUAI AUX HERBES: GHENT

The Romanesque Staple House (Maison de l'Etape), a granary of the 12th century, was restored in 1896. Next it is the House of the Grain Measurers, a Renaissance building of 1698, and beyond that the Skippers' House, said to be the finest Gothic guild house in Belgium, built in 1531, but recently restored.

our blankets along her 16-foot length of inner space, and fell asleep.

Next morning, when we lifted our tent curtains, Eight-o'clock Town's entire population, including the cows, was ranged along the canal bank, staring a community stare. That we produced and cooked breakfast in our nautical mystery which seemed half house, half craft, may serve to explain the reaction of one ancient bargee who turned to the rest, ejaculating, "Why, the thing's a—a baby canal boat!"

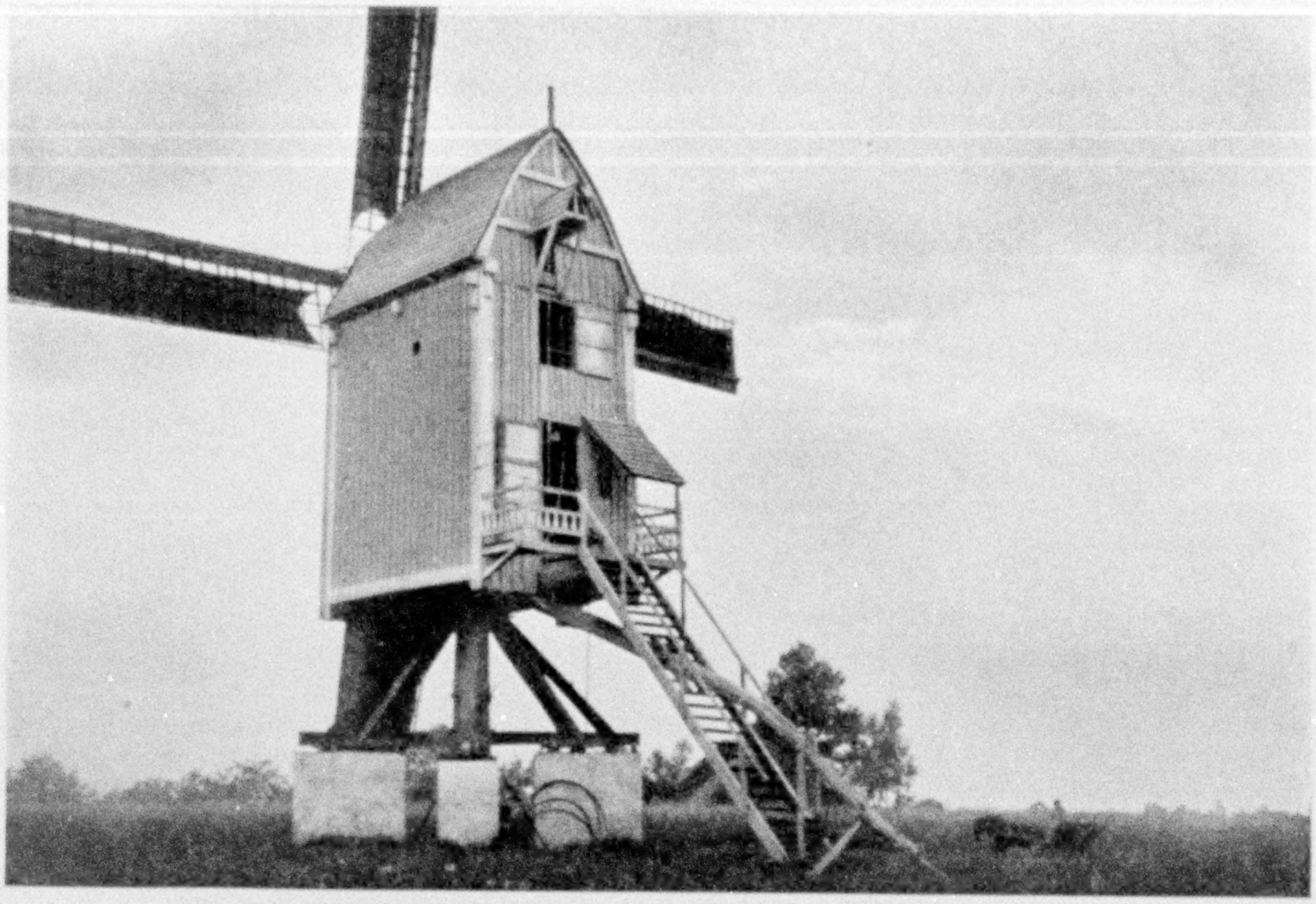
DOG CARTS COMMANDEERED FOR MOTIVE POWER

On we went, spreading sensation in village after village. Farm hands gaped. Graybeards stared, rooted to the spot. Babies in arms seemed to be gurgling, "I want to play with it!" And small boys hastily hitched draft dogs to miniature carts and charioteered madly after us along the towpath.

But for a happy inspiration on my friend's part, we should not have reached Ghent that night. He flung our bowline to the boys, who instantly grinned their comprehension. With three or four dog carts in tandem and the *Nageoma* hitched behind, we hurtled Ghentward at a dashing speed. We agreed that Browning's spirited Ghent-to-Aix gallop had nothing on us.

Hardly had St. Bavon's Cathedral towers lifted mistily across the roof tops when we sighted an appropriate precursor of the town which, thanks to Browning's poem, is identified in every school child's imagination with the feat of a noble horse. It was a canalside smithy, whose ancient swing sign portrayed 24 types of shoe, ranging from that of the racer to that of the great Flemish draft horse.

The workings of a poet's imagination may still be traced along the route of that famous ride which carried the apocryphal "good news" across Flanders to the German frontier. The horse hero, Roland, bears the name of Ghent's great



Photograph by Gevaert

THE TRADEMARK OF THE LOW COUNTRIES: A FLEMISH WINDMILL

bell. The name of Joris, one of the three horsemen, was apparently suggested by St. Joris, patron saint of Ghent's Crossbow Guild. At Malines (Mechlin) you may listen to the bells of St. Rombold's 15th-century tower, once intended to be the highest belfry in Christendom, while recalling that, "From Mecheln church-steeple we heard the half-chime." And an upleaping sun, against which "the cattle stood black every one," is a characteristic sight which you may encounter anywhere in flat Flanders.

We had paddled through Ghent's complex waterways and were wondering where we could leave our canoe in safety, when some racing shells shot past, a boat-house pennant fluttered, and a cheery voice invited us to utilize the Royal Club Nautique for as long as we wished. So we stored our canoe in the club's "garage," then drove through the town to a quaint inn whose leaded panes looked out upon a row of shops built into the outer walls of a great Gothic church.

IN THE INN WHERE DÜRER STOPPED

The sight of people flocking to service, while others sipped drinks, got shaved, or bought curios, all under the eaves of a sacred edifice, hinted that we were in an ancient quarter of the town.

"Is this an old inn?" we inquired of our Flemish host. He was a singularly literal man. He replied gravely:

"Not so very. Probably when built in the 13th century it was some wealthy man's home. In the 16th century, about the time Albrecht Dürer stopped here, it was the house of the Grocers' Guild. Later it was privately owned for a couple or more centuries. No, as an *inn* I wouldn't call it particularly old."

After that we reverentially used the doormat, and refrained from striking matches on the woodwork.

In bustling, up-to-date Ghent, it is especially difficult to realize the great age of some of the buildings which are still used for official business, trade, and pleasure. Dancers and beer quaffers congregate nightly in the cellar of the 14th-century Belfry; along the quay is the medieval Skippers' House or House of the Free Boatmen, still used as offices; while every housewife buys her chops and steaks at the *Groot Vleeschhuis* (*i. e.,*

Photograph by E. Sacré

MARKET DAY IN ST. NICOLAS' GRAND' PLACE, ONE OF THE LARGEST SQUARES IN BELGIUM

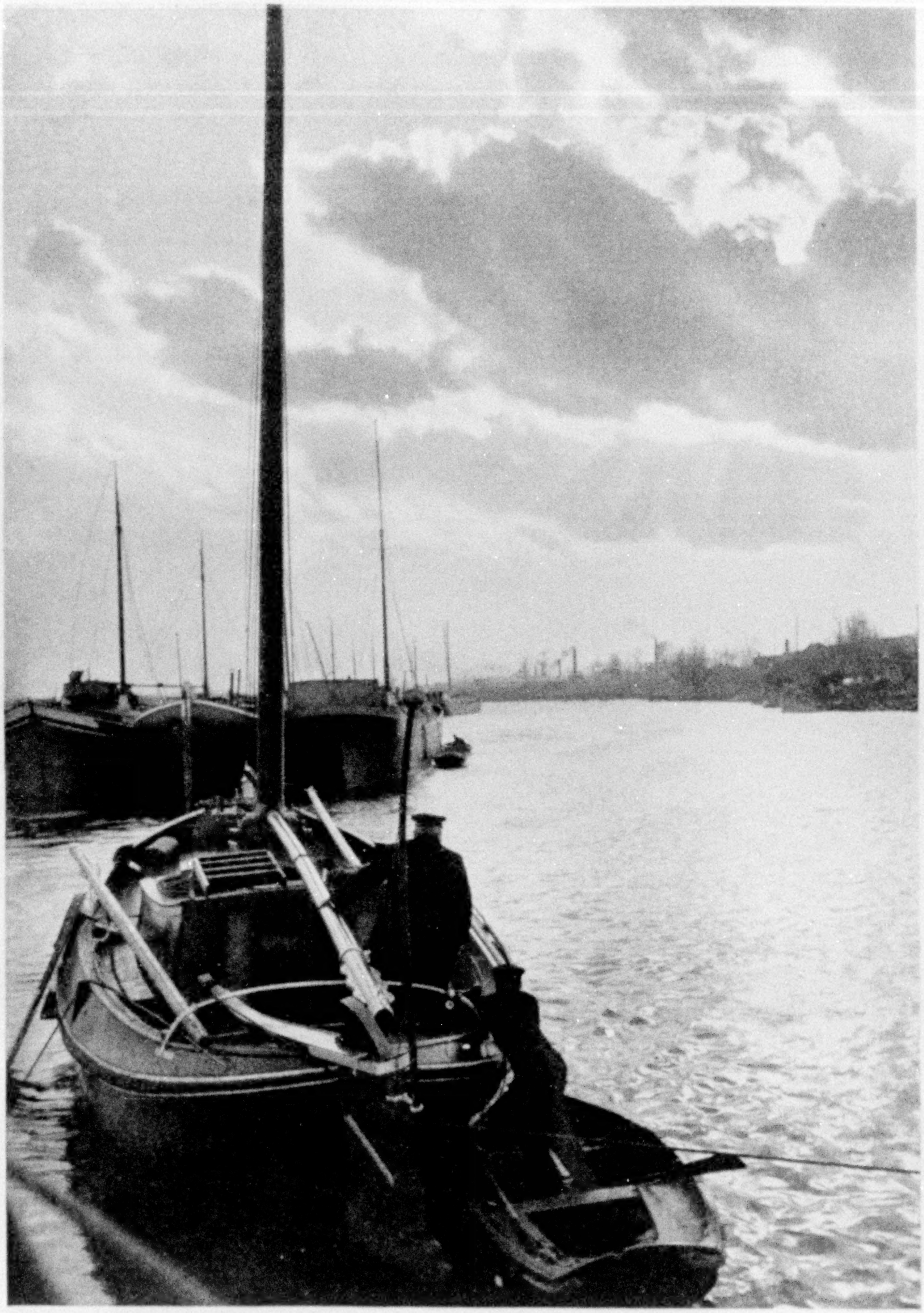
St. Nicolas, 20 miles from Ghent, is one of the busiest manufacturing towns in the kingdom.

Great Meat Market House), which has been carrying on since 1417.

That the Flemish have always been excellent trenchermen is abundantly apparent in their cities' street names and art galleries. A stroll along Ghent's numerous quays and alleys, named after fish, poultry, butter, grain, onions, tripe—not to overlook the Street of Lost Bread—will resuscitate the most jaded appetite; while the early Flemish painters' realistic studies of dinner tables groaning under huge supplies of beef, game, oysters, fish, onions, and wine, have been known to disarrange delicately balanced digestions.

Ghent's roll of famous men would be a long one, ranging from the van Eyck brothers, whose gigantic altar painting of the Adoration hangs in St. Bavon's Cathedral, to Jacob van Artevelde, the "brewer of Ghent," the city's 14th-century political boss, and hobnobber with neighboring kings. We would also like to nominate Oliver Minjau and his wife, who, says the tablet in St. Nicholas' Church, "had together one-and-thirty children." We are told that when a phalanx of 21 of the Minjau boys marched in a civic procession past Charles V, and he was informed that they represented only two-thirds of the family, the royal attention was "arrested," and we can quite believe it.

The heart of Ghent is its great bell,



Photograph by Gevaert

BARGE TRAFFIC ON THE RIVER SCHELDT

This "grayest of gray rivers" and its great port of Antwerp have long been recognized as important strategically as well as commercially. Napoleon saw that the river's mouth was opposite that of the Thames, and declared that "Antwerp might be made a pistol directed at the heart of England."

Photograph by Melville Chater

THE "NAGEOMA," IN TOW, SERENADES THE "ROSALIE" ON THE RIVER SCHELDT (SEE TEXT, PAGE 519)

Roland, whose vibrations are the pulse of the centuries. It was cast in 1314, recast in 1659, and was known successively as the *banclocke* (proclamation bell), the *stuerm-clocke* (storm-of-war bell), and later named for Charlemagne's famous paladin, with allusion to Roland's horn, whose call struck terror to his foemen's hearts.

Such nomenclature alone is enough to conjure up old scenes of public proclamation to arm against oppressive taxation; or storm-of-war scenes, as when the Ghenters went forth to fight the Brugeois, or the king of France, or the Spaniards, or, in fact, any one who interfered with their deep-seated sense of civic liberty.

And finally Roland's fiery nicknames became tamed into *huerclocke* (hour bell), which serves to remind us that town bells called to battle centuries before they became time markers, that our word "clock" originally meant "bell," and that, whenever your 7 a. m. alarm goes off, you are hearing the puny descendant of those mighty bronze throats which called medieval man to war.

Ascend Roland's Belfry* and, with the busy, canal-scored city stretching roundabout and into the illimitable plain, you will appreciate the bad pun of Charles V,

* See also "The Singing Towers of Holland and Belgium," by William Gorham Rice, in the NATIONAL GEOGRAPHIC MAGAZINE for March, 1925.

Photograph by Gevaert

SHIPPING IN A BASIN AT ANTWERP

Belgium's great city on the Scheldt, 55 miles from the sea, is the kingdom's only natural port. It serves not only its own industrial areas and those of Brussels, but also the central Belgian coal fields, with their factories. It is also the chief port for the Rhine Province and for much of Westphalia.

Photograph by Gevaert

MUSSEL FISHERS OF ANTWERP

who, when the Duke of Alva proposed to burn Ghent, showed him the view from the Belfry top, observing, "How many Spanish skins, do you think, would it take to make a *Gant* (glove) of this size?"

GHENT, A MEDIEVAL PICTURE AND A MODERN MART

But you must not allow that charming prospect of medieval gables and mellow canals to trick you into the belief that Ghent is a mere dream of olden glories. Quite the contrary. The 26 islets into which the Scheldt, Lys, and canal embranchments divide the city, include many miles of busy wharfage. It is a port of call for 19 shipping lines; it clears annually close upon two million tons of vessels. Its spinning mills employ 20,000 hands, and its trade in flower seeds and bulbs is world-wide.

Ghent is at once a medieval picture and a modern mart. Hardly have you assimilated the imposing figures of its chamber of commerce reports, when the 12th-century gloom of the battlemented and moated stronghold of the Counts of Flanders enwraps you. Perhaps you stumble upon the fact that the Crossbow Guild held a hotly contested shoot, last night. Or perhaps you wander by chance into one of those 12th-century religious institutions, consisting of "a walled town inside a city," and known as a *Béguinage*.

A nunlike figure admits you through a wicket in the 10-foot wall. Yet her speech and manner are curiously unlike those of an immured sisterhood, and your next impression is that you are strolling in some old English university close. The wide, tree-bordered lawn, containing a church and an infirmary, leads one into narrow, radiating streets where, from behind high brick walls, peer rows of small, ivy-clad houses.

Then you perceive that each door set in the wall bears some such name as "Huis van S. Anne," or "Huis van S. Nicholas," and that it is fitted with a small sliding panel for communication with the outer world—or rather, say, for communication with those who have penetrated this inner world. For the whole is a little municipality segregated from surrounding Ghent by its encincture of stone ramparts.

The winding, cobblestoned streets, the red roofs, the prim precision and neatness, all suggest a medieval Spotless Town, laid out with a foot rule. A

Photograph by Gevaert

THE TYPE OF MEN WHO HANDLE ANTWERP'S MILLIONS OF TONS OF SHIPPING

bloused baker's boy is delivering long loaves through a door panel. A black-robed, white-veiled *Béguine* sits at story-telling with a group of visiting children. Another tends her garden plot. All is cloistered peace. You breathe in centuries of silent piety.

Béguinages — which, says tradition, were first established in the 12th century by Lambert le Bègue (the Stammerer), a priest of Liége—are found in some 20 Flemish towns, Ghent boasting of two, containing 600 Béguines.

A conventual life, without perpetual vows and busied with the support of the needy and the care of the sick, constitutes the Béguine's existence. She may at any time, though she seldom does, return to the world. The order, with its strict adherence to an unworldly aim, with its unchanging costume and way of life, has survived the political storms of eight centuries.

THE CROSSBOW GUILD "A MUSEUM BROKEN LOOSE"

Our introduction to the Crossbow Guild was through the happy accident of stumbling upon the half-hidden existence of a tiny courtyard. There, through leaded panes, we beheld the unusual sight of modern men playing with medieval crossbows. It looked like a museum broken loose. Then we were invited inside, and found ourselves at a competitive shoot in the guild house of St. Joris, patron saint of *kruisboogschutters, i. e.,* crossbowsmen.

One by one the contestants "drew," or rather, wound up with a jack, the steel arc of what partially resembled an overgrown shotgun, then fitted a 6-inch steel dart to the gut string. With surprising velocity the missile traversed the range, imbedding itself in a small target of soft clay.

Though the bull's-eye was soon riddled with darts, a climax as sensational as Locksley's piercing the willow wand was to follow. It was after several shots that a tall man, decorated with a chain of office, drew his final dart from the bull's-eye, with its centering "wedding ring" of copper encircling the missile's pencil-like tip.

That shot reëlected the gentleman for

another year as "king" of Ghent's crossbowmen; and forthwith his name was inscribed in a parchment tome which contains the names of the guild's successive kings from 1500 to 1924. It was a popular victory, for the winner's family had lived at Ghent since 1400, or almost since the founding of the guild, which is first referred to in the city records under date of 1314.

Weekly archery tournaments are common throughout Flanders. Brussels is the *siège* or seat of the 14th-century Longbow Guild. And the tall, wooden towers which one sees in the countryside around Mons are indoor ranges in which the targets consist of stuffed birds dangling from the ceiling.

Photograph by Gevaert

FRANS HALS WOULD HAVE DELIGHTED IN THIS FLEMISH FISHER TYPE

Regretfully we reloaded the *Nageoma* and twisted our way in and out of many-towered Ghent to the great double locks which hold back the tidal Scheldt. Here lay numbers of steam barges, awaiting the ebb hour, and we locked through with a dozen of them, the *Nageoma* looking like a minnow among a school of whales.

DASHING TOWARD THE SEA THROUGH INKY DARKNESS

Mile by mile we drifted, rather than paddled, towards Antwerp, while periodically some red-roofed village, with its tall stacks, lifted above the green plain. For, no matter how sparsely settled may be the countryside, a Belgian hamlet almost invariably shows its factory chimney. Indeed, it characterizes the landscape of this highly industrialized people.

Toward sunset my friend brought out his ukulele and serenaded the Scheldt with jazz; and the skipper of a passing steam tug, the *Rosalie*, actually slowed down his engines to listen to "Poppa Loves Momma." We fell into conversation, and he said warningly:

"You'd better look out. The tide's turning, and there isn't an anchorage for another eight miles."

Having no wish to be caught after dark on a flood tide, we hitched behind the *Rosalie* and were towed to an anchorage at Termonde (see page 515). Indeed, we gladly accepted a further suggestion from the skipper, who planned to

Photograph by Emil P. Albrecht

A GLIMPSE OF THE PROMENOIRS, OR ELEVATED TERRACES OF ANTWERP, WITH THE STEEN IN THE BACKGROUND

The Steen was originally part of the Castle of Antwerp, dating from the 10th century, but of the present edifice there is little earlier than 1520. Charles V gave it to the citizens of Antwerp in 1549. Before that it had been a prison. Through it one enters the North Promenoir from the Quai Van Dyck.

wait there during flood tide, that he would tow us on the succeeding ebb, at 1 a. m., to Antwerp.

It was late when we took our sharp appetites into the town, only to find all the shops closed and the alleged hotels destitute of food. A good samaritan sold us some raw tomatoes, which we ate while walking back to the canoe.

"We will go to sleep," said my friend philosophically. "It's very sustaining."

But hardly had we closed our eyes, as it seemed, when the *Rosalie's* anchor chains rattled and we were off through the pitchy darkness. But presently the rush of water alongside ceased with suspicious abruptness, and I saw the *Rosalie's* stern lights dimming in the distance.

The towline had snapped.

To canoe seaward on the outrushing tide of a broad river, with mud flats shoaling alongshore and with great, black barges sweeping past you in the impenetrable night, falls quite outside the category of a joy ride.

IN THE HOME TOWN OF MERCATOR, THE MAP MAKER

We yelled as the monsters grazed us, and the skippers cursed back in broad Flemish. We dashed wildly past the half-bared flats, unable to find anything resembling an anchorage. At last we got under the lee of what we took to be a stranded hulk, and tied up to her. And suddenly torrential rains descended.

"Have you g-got a tomato handy?" came in shivering tones from the bow.

"Go to sleep—it's very sustaining!" I replied unkindly.

And again, as it seemed, hardly had we closed our eyes when a man leaned out of the morning mist, and growled. "This is a ferryboat, not a dock. Would you mind getting off my anchor chain?"

We plowed across intervening mud flats and reached the shore. The ensuing bliss with which we two drenched, shivering wretches spread our saturated effects in a friendly beet field, while the east broke through with glorious sunshine, and on our camp stove the coffee boiled and the eggs sizzled, is indescribable.

We caught a dropping tide which swept us along the Scheldt's sinuous course to its junction with the Rupel River. Here, amid a crowded quay of wondering faces, we landed in the quaint remoteness of a red-roofed townlet which should have been called Painters' Paradise.

A few cobbled streets where ruddy-faced grandmothers knitted behind leaded panes, some vanished château's crumbling tower beside a forgotten pool, a stream straddled by a moss-silvered millhouse, a sea-gate with mud-stranded barges—such was undiscovered Rupelmonde. At least, our maps and guidebooks ignored its existence, and certainly it was "undiscovered" from the material-hunting viewpoint of my painter friend.

"It's been overlooked!" he exclaimed joyously. "Maybe the map makers never came here."

Then a statue in the square caught our attention, and we drew near to find that this little tucked-away town's most famous citizen was in fact a map maker, and a distinguished one: Gerardus Mercator.

Gerhard Kremer—that was his name before he assumed the dignity of its Latinized form—was born at Rupelmonde in 1512, was graduated from the Louvain University, and once narrowly escaped execution for his religious beliefs. His long life was devoted to the preparing of those fine copper engravings from which Plantin of Antwerp printed the mathematician-astronomer's charts.

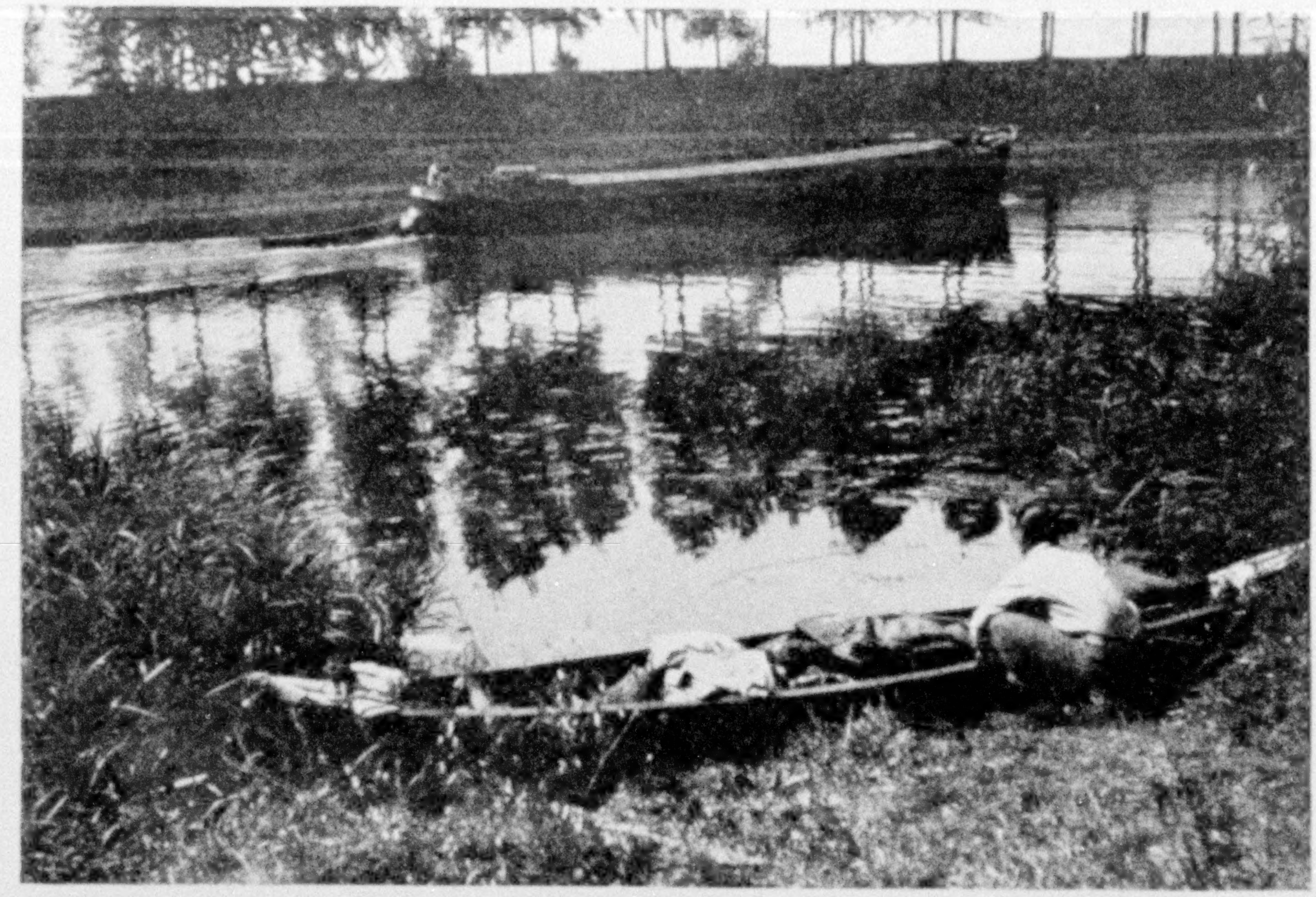
Mercator produced a world map in two hemispheres, terrestrial and celestial globes, and, in 1568, his famous planisphere. His name is a byword among navigators by reason of "Mercator's projection," on which the meridians and parallels of latitude are shown in straight lines, intersecting each other at right angles.

"Ah, *he'd* put his home town on the atlas, of course!" sighed my painter friend, a trifle grudgingly. "Too bad—Rupelmonde's been discovered!"

IN ANTWERP, PATRON OF PAINTERS AND TOPOGRAPHY

A few hours later the *Nageoma* was lying snugly in one of the many ship basins at Antwerp.

Shipping and art, throughout the vicissitudes of the centuries, have been the twin keynotes of the great port on the Scheldt. Decimated by Spanish oppression, ruined afresh by 1830's revolutions,



WAITING FOR A STRING OF STEAM BARGES TO PASS: BRUSSELS MARITIME CANAL

long hampered by trade rivals levying navigation dues, and crippled once more between 1914-1919, Antwerp nevertheless always rises anew from commercial disaster.

At present she has "come back" to the extent of being the gateway for some 14,000,000 tons of imports and exports per year, which is 28 per cent less than before the war; while her annual passenger embarkations are 65,000, or one-half of what they were in 1913. Yet, that Antwerp expects her phœnixlike history to repeat itself, is shown in progressing installations which will double her port capacity.

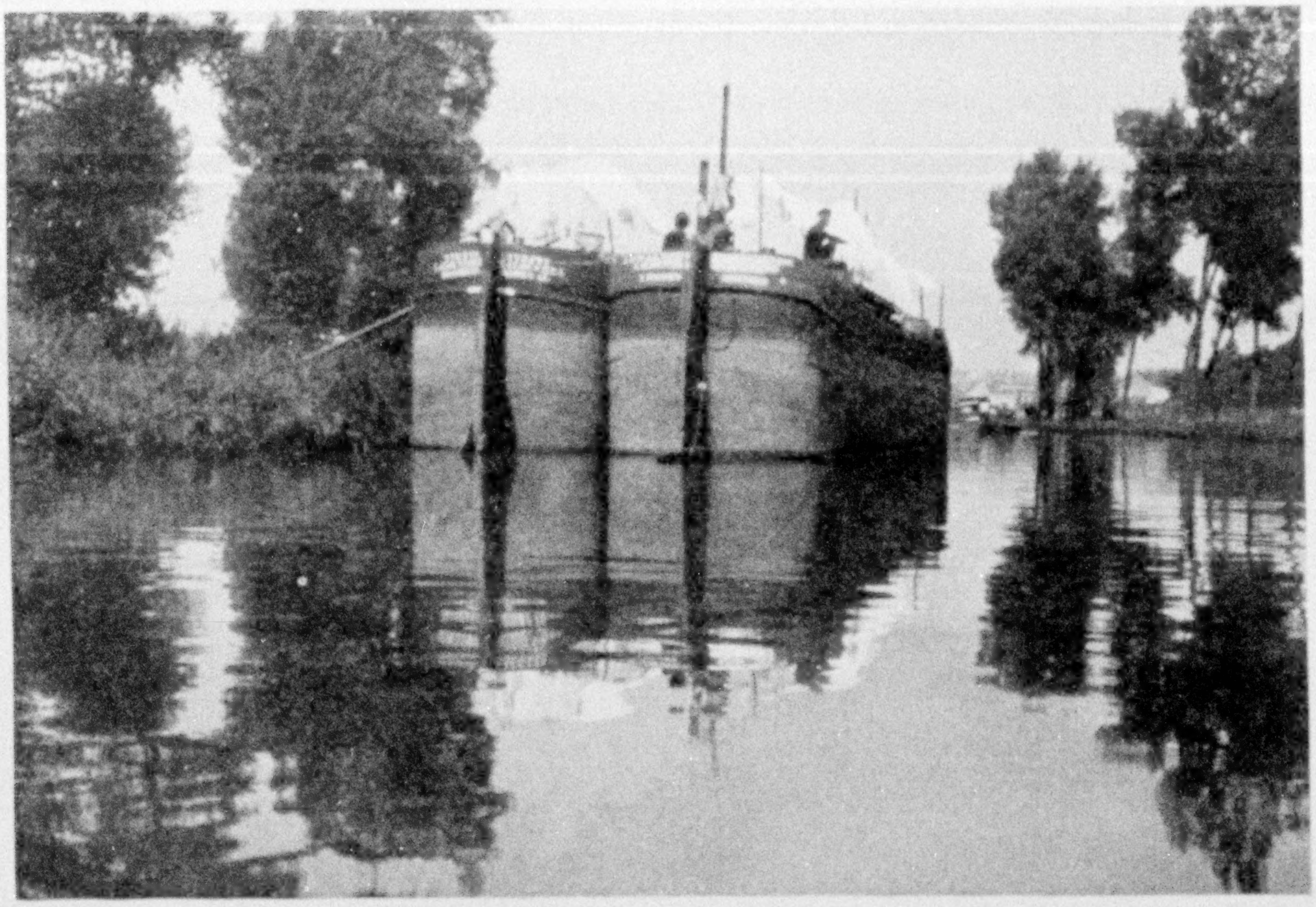
Antwerp's tradition of wealth is evidenced by her patronage of Rubens, Van Dyck, Jordaens, and half a dozen other great painters—not forgetting Matsys, who quit blacksmithing for the palette, as the legend goes, in order to win a wife—whose native or adopted city still teems with their rich canvases.

Antwerp was the patron, too, of typography. A stroll through Christophe Plantin's ivy-clad establishment — his home and printing office, the scene of his firm's activities for 300 years—charms you with its vast display of early editions, its antique presses, type fonts and foundries, as you pass through oak-paneled vistas where 16th-century printers' devils once responded to cries of "Copy!" and readers corrected galley proofs, using symbols closely resembling those of today.

EUROPE'S PREMIER DIAMOND CENTER

Or you may witness an interesting phase of Antwerp's modern wealth by visiting the diamond-cutting workshops. Here grayish, soapy pebbles of no apparent value are sawn in twain by a copper band smeared with oil and diamond dust, then cut and polished by a revolving disk, similarly smeared, into the faceted gems that glitter from show-case windows on Fifth Avenue and the Avenue de l'Opéra. Thousands of hands are employed at Antwerp in this highly skilled trade, and it is said that since the World War the port of the Scheldt has become Europe's premier diamond center.

Stately boulevards, rich art galleries, tangled side streets watched over by gaudily painted madonnas, flowers everywhere—even boxes of them encircling the



Photograph by Melville Chater

WASH DAY ON THE CANALS

"Cleaning day leaves a Belgian barge as spotless as blanched linen. Everyone has been at it, for nobody aboard is lazy, not even the dog" (see text, page 526).

electric-light poles—and many a humble, war-recalling "Café Blighty" or "Allies' Bar,"—such were the last impressions we carried away with us up the swiftly flowing Scheldt.

We regained the Rupel River and locked through into the Brussels Maritime Canal. This, an enlargement of a 15th-century cut, represents Belgium's latest word in canal construction. With its neat, grassy banks, its parklike vistas of trees and pellucid waters, I am afraid that such interesting facts as its locks' capacity for handling vessels 320 feet long by 43 feet beam, were overlooked in our concurrence that it would be an ideal stretch for shell racing.

SUNDAY NIGHT, BARGEMAN'S HOLIDAY

As we neared Willebroeck, late one Sunday evening, we glimpsed ahead what looked like the makings of a Venetian fête. The long quay was crammed with huge, illuminated canal boats whose lanterns served to light the mirroring water, a-flicker with reflections of house rows and the holiday makers who danced everywhere along the canal side and across its low bridges. We heard the brassy clash of merry-go-round music, saw the glare of scores of barrooms, illuminating the endless weave of street waltzers.

"No work on the canal to-night!" roared two burly bargees, lifting rather than assisting us out of the canoe. And they fell to waltzing with us in a grizzly-bear hug, amid screams of women's laughter.

It all meant this: that it was Sunday night and bargeman's holiday.

Willebroeck's upper windows were black and dumb as a midnight churchyard, for its 12,000 people were all in the garishly lit streets—the streets of a factory town which had poured forth its multitude of mill girls to dance with bargees from all Belgium.

In pairs they swung around the carrousel's circle of wooden steeds, human moths flitting about a central flare, or fell into impromptu waltzes to the orchestrion's blaring strains, while awaiting their turn among an audience of bargees' wives who jigged their babies to the music's beat.

Then a dive into the open booth where

Photograph by Nels

THE BROOM CORPS OF LIÉGE, A POST-WAR OCCUPATION FOR WOMEN

Note the sabots worn by the two "whitewings" in the right foreground.

some bare-armed amazon ladled salted potato slivers from a mammoth frying-pan, and they would continue waltzing, eating, making love, all simultaneously.

Shots cracked in rifle ranges, "barkers" bawled at side-shows' entrances, and broken-down hacks bore huge bargees—trust Jack ashore to try horse navigation—around a sawdust ring.

They wore corduroys and white neckerchiefs, these hair-plastered, soap-burnished men who had overstretched a week's heavy toil to make Willebroeck that night. By to-morrow's dawn they would be off for Antwerp, or the far Campine, or even the Rhine; and their bareheaded partners, with swabs of hair looped low on their painted cheeks, would be re-engulfed by the paper mills' roar, wondering if they would ever see them again.

Watery stout and alleged "pell-ell" (pale ale) flowed in keeping with the human tide that washed in and out of barrooms, where jigging and horseplay and good-humored face-slappings revealed irrecapturable comedies in cinemalike "flashes" of action. And though the solitary man who perambulated outside, smoking a Dutch pipe, was a plainly clad policeman, the mere whisking-off of his gilt-braided cap, at the first sign of trouble, would transform him indistinguishably into a noninterfering citizen.

Over this amazing sight of a whole townful, from toddlers to grandparents, eating, drinking, and sidewalk-dancing, the street booths shed the light of their kerosene flares, throwing into relief picturesque face types of blond Fleming and dark Walloon. It was like a carousal scene from the brush of some old Flemish master. If any artist wants a subject that would have captivated van Ostade, let him visit Willebroeck on a Sunday night and paint "Bargeman's Holiday."

Though from the outset we had been assured that permits to circulate on Belgian canals were not necessary, the *éclusiers* (lock keepers) at Willebroeck, next morning, proved adamant until we had procured a document stating the number of inches of water and "of air" drawn by the *Nageoma*, and containing our signed avowal that "the impenetrants will not obstruct the progress of canal boats."

While the notion of our obstructing

Photograph by Gevaert

A BIT OF SCANDAL IN FLANDERS

500-ton steam barges gave us at first an undue sense of our importance, it soon became evident, by our continually having to dodge their swift approach, that this was merely a polite way of saying that we would avoid being run down.

BELGIUM'S TRAFFIC PROBLEMS SOLVED BY CANALS

The significance of Belgium's canal system is best realized on the Maritime Canal. With its steady stream of big barges, it floats some 60,000,000 kilometric tons—*i. e.*, a unit of one ton traveling one kilometer—per year, between Brussels and the sea. Motor-boats give a daily fast-freight service between Belgium's capital and its important towns, and you may even load your goods at Brussels on sea-going vessels for delivery in London.

The Terneuzen-Ghent canal is Belgium's deep-sea connection for exportation of cotton goods, while the Dutch-owned Hansweert Canal carries barges of 2,000 tons from Antwerp up the Rhine to Alsace and Switzerland. Belgium's canals, in a land not richly served by rivers, form a vital part of her economic arteries. Of her 1,600 kilometers of navigable waterways, 1,000 kilometers are canals. Her interior water traffic over all routes exceeds annually 1⅔ billion kilometric tons.

CLEANING DAY ON A BELGIAN BARGE

We solved the problem of dodging barges by hitching behind one of them, *The Esperanto*, and the skipper's wife invited us aboard and asked us to breakfast. While this was being prepared, her two round-eyed little girls edged shyly forward and asked where we had come from in our little green boat.

"From America," responded my friend unblushingly. An awed silence followed this statement, then the elder child, perhaps reflecting that there were no laundries on the Atlantic Ocean, inquired helpfully, "Maybe you'd like to have your shirts washed?"

In fact, it was a Monday, the general

AN AIRPLANE VIEW OF THE GOTHIC CHURCH OF SAINTE GUDULE: BRUSSELS

Dedicated to the tutelary saint of Brussels, this sacred edifice was begun in 1220, and is considered one of the finest examples of pointed Gothic architecture. It contains some rich stained glass and a curious oak pulpit, Verbruggen's masterpiece, representing the expulsion of Adam and Eve from the Garden of Eden. The church, sometimes erroneously called the cathedral, is built on a slope now covered by the fashionable quarters of Brussels.

cleaning day on canal boats as on shore. As far as eye could see along the outstretched line of barges, washing flapped in the wind. The women were at scrubbing boards; the men, with swabs on long poles, were repainting the sides of their craft. The small boys were burnishing the decks, and the little girls were watering window boxes planted with geraniums.

Cleaning day leaves a Belgian barge as spotless as blanched linen. Everyone has been at it, for nobody aboard is lazy, not even the dog, who not uncommonly is hitched up and harnessed to the towrope, in the case of those slowest of slow barges whose sole motive power is the family's biceps.

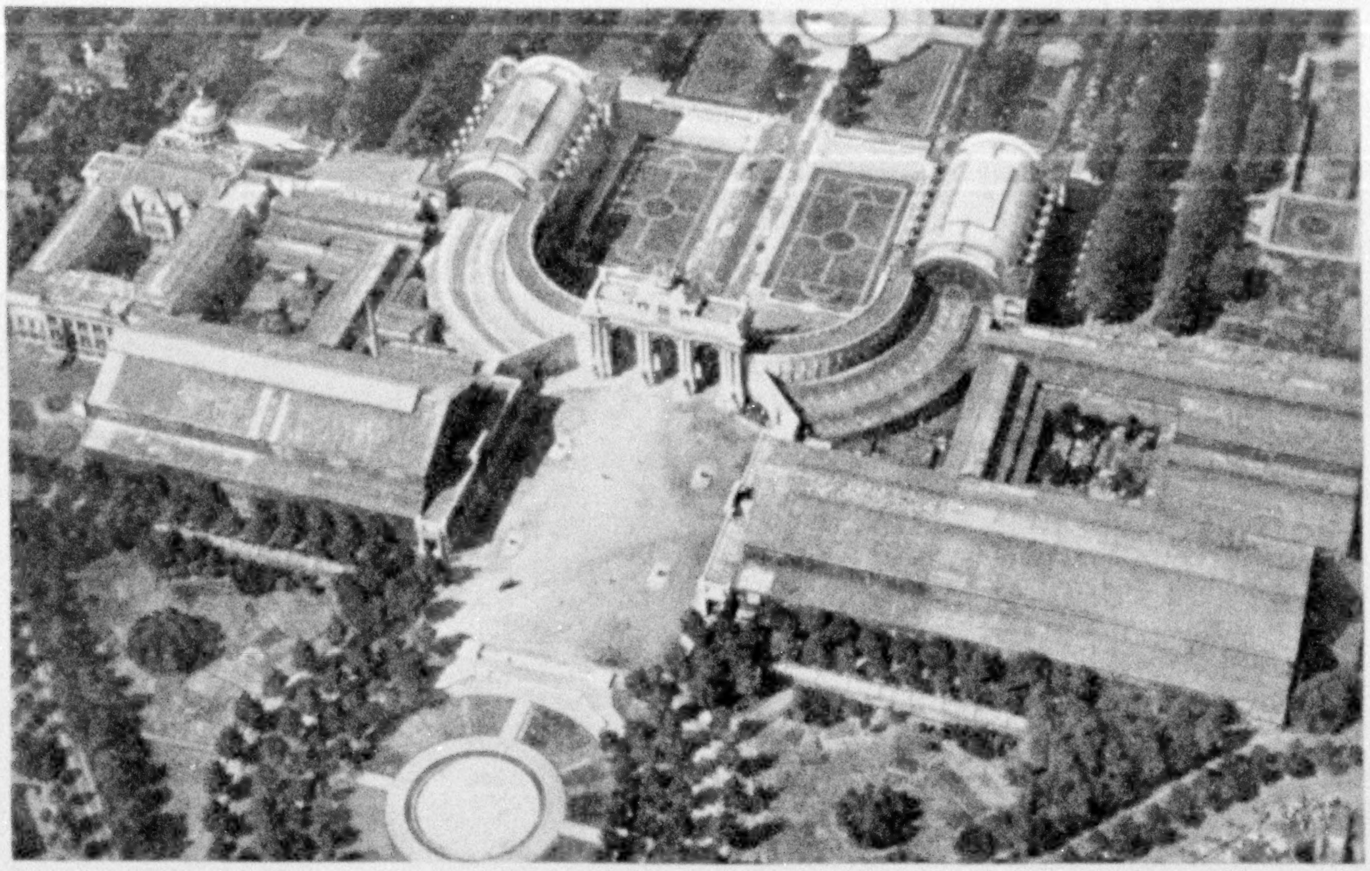
The sight of ocean freighters coaling at some near-by docks revealed that the Maritime Canal had brought us to Brussels. We slipped our tow, stored the canoe at a hospitable boat club, then headed for the town.

At Brussels, according to your taste, you may either wander among the "hill's" modern beauty spots or in the older "valley," where a blaze of smart shops, radiating from the Grand' Place—the city's medieval masterpiece of architecture—relegates to dim remoteness the days when Brussels was Brucsella, or "the Dwelling in the Marsh."

BRUSSELS AND THE STORY OF ITS GUILDS

When it comes to cosmopolitanism, Brussels yields little to its gigantic neighbor on the Seine. If Paris is the greater diamond, Brussels glitters with a more concentrated luster. Or, if you seek the mellow past, Paris gives it to you on a big canvas, while at Brussels its close-packed lineaments resemble a miniature.

Rightly, indeed, should quaint old ladies under huge umbrellas tend their veritable garden spots of cut flowers from end to end of the gabled Grand' Place. They are but continuing the trade tradition which has centered there for five centuries. But *trade* . . .? You stare around at that glorious uprearing of edifices, their balustrades, carved woodwork, and gildings, and envisage not trade but emperors. Yet, in fact, here are the



THE PALAIS DU CINQUANTENAIRE: BRUSSELS

This structure was built in 1879-80 for the exhibition of 1880, when Belgium celebrated the 50th anniversary of her independence. It consists of projecting wings, with a colonnade in the middle. The triumphal arch, erected by Leopold II in 1905, is 148 feet high, with three openings, each 33 feet wide. The palace is now a museum of decorative and industrial arts and of antiquities.

guildhalls of the mercers, skippers, grease merchants, printers, bakers, brewers, and butchers.

The upper town contains in Notre Dame du Sablon (see page 531) a reminder of the guilds' wealth, since that of the Crossbowmen erected the original 14th-century edifice; while the adjoining square, its rail topped by 48 bronze guildsmen, each bearing his appropriate tool—hammer or ax, butcher's cleaver, or baker's kneading board—illustrates the extension of the guild movement to include practically every trade existing in the 16th century.

What and why were the guilds?

That the root word means banquet, contribution, worship, and sacrifice seems to indicate a movement aiming alike at bodily welfare and spiritual salvation. Very possibly the idea of Christian brotherhood originally mingled in what later became mutual-aid societies of voluntary membership.

A guild comprised the artisans of a single craft or industry in a single town. Its officers regulated working hours, terms of apprenticeship, and, because intertown trade rivalry was keen, upheld standards of quality. Sometimes it went in for a kind of insurance. Our state pensions and our fraternal societies' mutual-aid schemes are legitimate descendants of the medieval guild's provisions for supporting its members in sickness, old age, and poverty.

STIRRING SCENES STAGED IN BRUSSELS' GRAND' PLACE

Incidentally, the guild helped to develop a civic consciousness and supplied a ready-made organization for rallying with weapons and trade banners at the cry of tyranny or overtaxation.

In that long struggle to develop a voice of the people despite hereditary duke or foreign oppressor, the Grand' Place at Brussels has often run with the blood of its guild leaders and patriotic burgomasters. Often has it echoed to armed clashes between the guilds when, grown powerful enough to defy their overlords, they occasionally fell to quarreling among themselves. Here, too, in 1793, was pro-

Photograph by Melville Bell Grosvenor

FLOWER-MARKET IN THE FAMOUS GRAND' PLACE OF BRUSSELS

Guild houses dating from the 17th century, with their richly gilded gables, statues, and balustrades, face on this court, giving it a most picturesque appearance. The second house from the left is the "Hall of the Skippers" and the gable is supposed to represent the poop, or stern, of a large sailing vessel of that time.

claimed the great news that the French had risen against kingship and were shouting for government by the people.

OPERA AUDIENCE DECLARED BELGIUM'S INDEPENDENCE

The south Netherlanders' age-old struggle toward self-government, from the Roman conquest to 1830, certainly justifies Julius Cæsar's comment on the courage of the Belgæ.

Under Rome for 500 years; partitioned between France and Germany in the 9th century; divided into countships and duchies under the feudal system; successively governed as "the Spanish Netherlands" and "the Austrian Netherlands" for another three or four centuries; in-

corporated with revolutionary France; merged with Holland into "the Kingdom of the Netherlands"—this small, much quarreled-over people miraculously survived every form of exploitation, maladministration, and political experiment.

In 1790 their formation of a "Belgian United States," though it was immediately crushed by Austria, showed that they had caught an inspiration from across the Atlantic. And when, in 1830, revolution came to Paris, and an opera audience in Brussels, inspired by patriotic airs, rushed into the streets, crying, "Imitate the Parisians!" there was inaugurated the final revolt which transformed a vague, foreign-governed section of the Netherlands into a political entity named Belgium.

In the following year, a national congress elected a king from the house of Saxe-Coburg, and the Powers recognized Belgium's sovereignty as a neutral state.

A volume might be written on "Belgium, the Battleground of Western Europe." Ramillies, Oudenarde, Waterloo, Jemappes, and many other battle names, not to mention those of the World War, indicate that for centuries the Low Countries have been the scene of international conflict. Not merely as a symbol of a recent yesterday do "poppies blow in Flanders fields."

WHERE DOGS GO TO BOARDING SCHOOL

At Brussels, as throughout Flanders, civic monuments ought to be erected to that soldier-policeman-laborer, the dog. We heard of his war exploits. We beheld him harnessed, drawing milk, washing, and garbage. Sometimes he was hitched to war-cripples' gocarts. Sometimes he was doing night-patrol duty in city cemeteries. And sometimes, indeed, when we saw him towing an able-bodied man on a bicycle, we almost expected him to growl out, "A bit thick, this—canine joy riding!"

He even goes to boarding school, as any visitor in Brussels may witness at the *Club de Chiens Utiles*. This is a training center for dogs, who ultimately matriculate for service on some municipal police force, or for competition purposes in the concourses which are held regularly all over Belgium.

We were ushered into a 70-yard stretch of dirt courtyard, high-walled, with a row of kennels behind a padlocked gate. Upon the trainer's arrival, excited barks announced his pupils' keenness for the day's lesson. One by one they were led forth, unmuzzled and tried out, Tom and Mac especially distinguishing themselves.

They were black shepherd dogs of the celebrated Groenendael breed. Scent, agility, strength, audacity, fidelity, vigilance, and intelligence are the characteristics of this race. The comparatively small amount of training needed by the shepherd dogs is a striking example of hereditary influence.

Tom, aged two and a half years, had not had any food since early morning. Apparently by accident, the trainer dropped a bit of raw meat under the recumbent animal's nose, then sauntered off. But Tom knew. His expression was a study as, his nose averted, he sedulously studied the weather.

TRAINING A POLICE DOG TO ATTACK A THIEF

In public concourses, the judge commonly throws raw meat to a contesting dog. To touch it means instant disqualification, since the dog has permitted someone other than his master to feed him.

"Tom sit!" "Tom lie!" "Tom stand!" At these successive orders, the dog smartly took the required positions. He then repeated them in any given order, as the trainer made silent signals with his fingers.

After the dog had repeatedly leaped an 8-foot wall and a pit 20 feet across, he was temporarily kenneled, while a tough-looking and sufficiently padded individual, the school's paid "thief," secreted himself in one of the yard's many hiding places. Then out trotted Tom, with a "What's next" expression in his wolfish eyes.

At the trainer's signal, which indicated the discipline of "Find him, frighten him, but don't attack him," Tom was off, nosing behind chicken coops and woodpiles till, with a signaling bark, he unearthed the thief. Then, by sheer intimidation, he forced the fellow to accompany him to the trainer's side.

Now the thief suddenly drew a revolver. The trainer shouted the signal for attack, and at once Tom leaped upon the malefactor, careless of the successive

shots, with a jaw grip that would have disabled any man (see page 534).

"Hey, call him off!" entreated the thief, after a few moments of this. And, at the signal, Tom instantly dropped stomachwise on the earth. "Guess I earn my pay—four times a week of this!" added the thief, glancing in our direction.

The pan-Belgian training congress tabulates for concourse purposes 13 tests, including those just described, each with its point value and point penalization for the slightest deviation from form. Tom, who had recently won his 27th "first" in concourse, for training and beauty, might well be described as a lucky dog. He had never been beaten or starved — words which did not exist in his trainer's vocabulary.

"I trained him entirely by gesture and word of mouth," explained the latter. "A beaten dog is a cowed, a ruined dog. And to strike your dog in concourse means instant disqualification."

On the World War's battlefields, the black Groenendaels and their cousins, the fawn-colored Malines breed, carried messages and first-aid outfits, and even drew machine guns. They were shot, bayoneted, and taken prisoner, like any soldier, and they returned to civil life with sadly thinned ranks.

Their police exploits in peace time would fill a book. Our choice for quotation falls on Ixe, who, having arrested a drunk and disorderly female and delivered her at the police station, dashed back alone to the scene of the misdemeanor, shortly turning up at the sergeant's desk with the lady's hat in his teeth.

LOUVAIN HAS BEEN REBUILT LARGELY BY AMERICA

From Brussels it is but a step to Louvain. To-day, remembering the charred war wreck that it was, one rubs one's eyes at the scrupulously trim squares and boulevards where rises acre upon acre of quaintly gabled houses, done in pinkish brick, the scene of placid domesticity. Yet you have only to note the small, gray, memorial-stone inset in each house front, inscribed with the date "1914," to realize that in great part the old Louvain has perished, and that what you behold is a cunning replica.

Long-sought peace has stilled tragic Louvain. The War seems ages past. The two German cannon in the square, their wheels deep in grass, their muzzles straddled by small boys playing at horseback, recall the carcasses of beached monsters, thrown up in the fury of some long-forgotten storm.

As the native guide pilots you about, indicating whole streets of new houses, or perhaps the yet-unfinished library, he keeps explaining, "The Americans did this," repeating the phrase so often that after a while he merely points here and there, with the one word "America!" Truly, while the University library is that country's war memorial to Belgium, in the heart of Louvain's citizens there is builded a war memorial to the American people—a house not made with hands.

From Brussels southward the Back Doors Country grew hourly more charming, more remote from the industrial beehive which is Belgium. Now at last Flanders' flatness gave way to rising ridges, between which wandered a lovely, tree-vistaed stream that our map persisted in calling a mere canal.

MATRIMONIAL PICNICS FOR R. F. D. NEIGHBORHOODS

In this fishermen's realm, where yarn-spinners sat about sand-strewn taprooms, we needed no word of Flemish to comprehend that universal gesture which accompanies the statement, "Believe it or not, he measured *that* long."

Behind the bar invariably hung the same two posters, the one advertising a fishing competition, the other couched in the following terms:

> A TASTE OF MARRIAGE!
>
> Repentant celibates, know that the bachelors of Itre will introduce themselves to the young ladies of Ronquières next Sunday through the agency of a canal-boat picnic. One dances, one lunches superbly, one respectfully adores. Tickets, 15 francs. In case one should not encounter one's fate, the young ladies of Ronquières will sponsor a reciprocal picnic on the Sunday following.

We were told that this naïve form of matrimonial agency, meant for those living in the R. F. D. neighborhoods, is taken in entire seriousness and is productive of many happy marriages.

Photograph by Emil P. Albrecht

A REMINDER OF THE MEDIEVAL GUILDS: NOTRE DAME DU SABLON, BRUSSELS

This church is said to have been founded in 1304, by the Guild of the Crossbowmen, to celebrate the Battle of Woeringen (Worringen), 1288. The adjoining square, where the stone columns of the railing are topped by 48 bronze figures representing guildsmen, each with his appropriate tool, "illustrates the extension of the guild movement to include practically every trade existing in the 16th century."

XUM

Photograph by Emil P. Albrecht

A CORNER SHRINE IN BRUSSELS

But, of course, there was the old village misanthrope who, pointing to the aforesaid two posters, snarled sourly:

"Fishing! And marriage! Same thing—never know what you're going to hook!"

COAXING A MEAL FROM A FLEMISH INNKEEPER

Possibly it was due to the matrimonial picnickers lunching so superbly that the Flemish inns, so far, had seemed to be cleaned out of food. It was not as in the French back doors country, where at a word a peasant housewife will snap into it, producing a delicious something-or-other to eat within 20 minutes. But I say "seemed" cleaned out, because it is merely a matter of prodding the Flemish innkeeper's imagination—as thus:

"What's for dinner to-night?"

"Dinner?" Heavily he shakes his head, as though unacquainted with the word.

"Meat, beans, beets, you know," we pursue cheerily. "Anything will do."

Another heavy headshake, then: "Nothing of that kind; no food in the house."

But being accustomed to Flemings by now, we continue winningly. "Perhaps you could find half a dozen eggs?"

"Oh, as to eggs—." His expression indicates the not-impossible.

"And salad?" We point to his lettuce patch.

Photograph by Emil P. Albrecht

SAILING BOATS IN FRONT OF THE PARLIAMENT HOUSE: BRUSSELS

The building in the background is part of the Palais de la Nation, or Legislative Chambers, built in 1779-1783. The right wing was burned, and rebuilt in 1884-1887, and houses the Chamber of Deputies; the left wing belongs to the Senate.

"Why—er—I suppose—." (He is softening.)

"And cold potatoes, left over from midday? And a *tartine* (huge morsel of bread) and cheese?"

He relents, leads the way indoors. And we are soon dining famously on omelet, potato salad, bread and cheese, lengths of smoked sausage, and beer. Yes, it is quite an art—coaxing food from Flemings.

But, as we penetrated the Walloon country, it was all quite different. Here, instead of blue-eyed, flaxen-haired Flemings, we found the warm-faced, sprightly descendant of the Latin, speaking a tongue vaguely resembling French, quick to anticipate a traveler's needs, and bubbling over with questions about our canoe and ourselves.

THE MINISTRATIONS OF MADAME ALWAYS SMILING

It was at Virginal, a clump of little houses on the canal side, that we made acquaintance with the Walloons in the person of an innkeeper's wife whom we called Madame Always Smiling. For her cheery smile radiated through that humble establishment, half shop, half inn, from the moment we two semitramps appeared until she propped a huge bouquet of

Photograph by Melville Chater

A PUPIL IN THE DOG SCHOOL OF BRUSSELS GIVES A DEMONSTRATION

The man, posing as a thief, is heavily padded to protect himself against the savage attack of a prize-winning police dog (see text, pages 529-530).

flowers in the *Nageoma's* bow and waved us *bon voyage*. And meanwhile she was constantly bustling about to cook, or mop up, or dry out garments for the wet and hungry fishermen who arrived at all hours.

No, nothing could upset Madame Always Smiling; not our importunate demand for beefsteak (she bicycled off somewhere for 20 minutes to get it), not even our reappearance on her threshold, next sunrise, in the condition of two drowned rats, surrounded by the dripping contents of our capsized canoe.

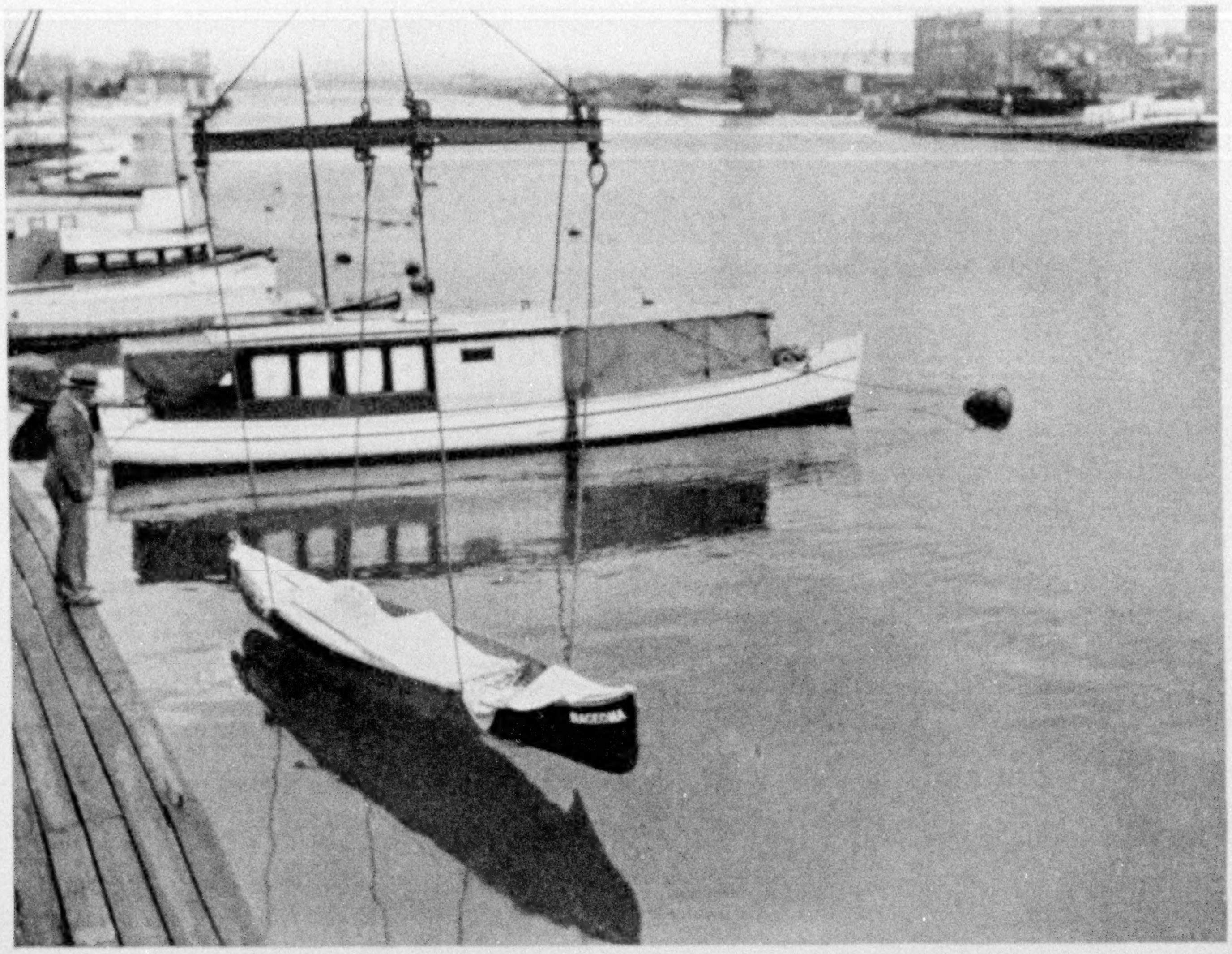
This had occurred as the result of our trying to crawl aboard from a treacherous bank in the pitch darkness. A chance tip, an inrush of water, and the *Nageoma* settled at the bottom of the canal. For half an hour we stood waist-deep in water, fishing our effects out of the canoe and pitching them ashore. Then another two hours were spent in carrying them across the fields to the now fast-slumbering inn. After that, we walked up and down to keep warm, and studied the slow paling of the constellations toward a prayed-for dawn.

Sunrise found us surrounded by a hideous slush of blankets, pillows, clothing, guidebooks, cameras, and suitcases, all as juicy as newly gathered seaweed.

Nothing unsopped remained to us, not even our paper money, which we ultimately hung out to dry on the clothesline. We thought only in terms of moisture; our universe was sodden. My friend voiced a feeble joke about his sponge having come through it magnificently. We shared a sickly feeling that our careers were blasted, that life would never be quite the same again.

And then Madame Always Smiling appeared on the threshold, lifted her hands in comic horror, and fell to work. In half an hour she had thawed us out with steaming coffee, in another half-hour she had our effects clustered about the cookstove or spread out in the sun, and meanwhile she had made up two beds and was telling us to go to sleep at once, which we did.

When we awoke our equipment was bone-dry and neatly piled, our torn garments had been repaired, our very buttons had been sewn on, and Madame was peel-



LAUNCHING "THE NAGEOMA" AT BRUSSELS

ing potatoes while humming a Walloon ballad, as smilingly unruffled as if mad canoeists and their misadventures were all in her everyday's work.

"There, it wasn't so bad after all, eh?" she said happily. "And would the *messieurs* like a small chicken, with mushrooms, for dinner?"

Often we blessed Madame Always Smiling and her cheery race as we paddled southward toward Charleroi.

AMERICA'S DEBT TO WALLOON AND FLEMING

Draw westward a line from Visé through Brussels to Calais, and you will approximately demark Belgium's two native languages, Flemish on the north and Walloon on the south. The former differs not so very greatly from Dutch, while the latter has so far diverged from the original French *patois* as to be almost unintelligible to Frenchmen.

More than 3,000,000 Belgians speak only Flemish, and nearly 3,000,000 speak only Walloon or French. The last-named is the kingdom's official and upper-class language.

The imagination which initiates, and the slower doggedness which sees things through—these are the respective contributions of Walloon and Fleming to the Belgian national character, somewhat as volatile Celt and phlegmatic Saxon mixed their strains in the English people.

The transatlantic contribution of Walloon and Fleming should be memorable to every American. Walloons settled in practically all of the Thirteen Colonies. Certainly one-half of Europe's first-comers to New York, New Jersey, Pennsylvania, and Delaware were from the southern, or Belgic, Netherlands.

Their early presence is still attested to by countless family names and place names, as well as by old city seals whose inscriptions mention New York as Novo Belgico, that is, New Belgium.

BELGIUM IDEALIZES INDUSTRY

Even so countryfied a strip of canal as that which led us on to Charleroi ex-

Photographs by Melville Chater

A STRETCH OF CANAL BETWEEN BRUSSELS AND CHARLEROI

hibited what I am tempted to call Belgium's idealization of the principle of industry. There was no hamlet without its poster, whose heroic figure of Labor advertised current industrial fairs. The governmental certificate, hanging in many an old lock-keeper's house to proclaim his 25 years of faithful performance, bore similar titanic figures, Service and Labor, hand in hand.

Another national poster, everywhere seen, revealed the spirit in which Belgium has tackled her postwar problems. It ran: "Save the franc by avoiding all waste of bread!"

The national precept of putting one's back into it could not be better illustrated than by the small privately owned barges that we so often passed. Each was drawn by a mother and her graduated assortment of sons and daughters, all wearing leathern chest bands attached to the towline, all leaning forward in a kind of lock step, often under umbrellas in a pouring rain, while father did the headwork at the barge's helm.

With the increasing press of traffic toward Charleroi, these hand-drawn barges, making perhaps two miles an hour, became our *bêtes noires*. In a single morning we beat one of these to a dozen successive locks, only to be held up for her arrival, when she would lock through ahead of us and glide away, her stern displaying the highly irritating name *"Au Revoir."*

CHARLEROI A GRIM REALM OF STEEL AND COAL

Belgium's "black country" loomed up in the form of endless wharfage, gangs of staring, smutty-faced pit boys, forests of tall stacks, and an Alpinelike prospect of mountainous slag heaps, their sky-cutting peaks continually augmented by dump cars running on aërial railway tracks. Lathe buzzings, chain clankings, the confused roar of factory and mine shaft—such was the voice of Charleroi.

The presence in this district of seventy-odd coal seams, some ranging from 3,000 to 4,000 feet deep, has made Charleroi, with its 40,000 iron, coal, and glass workers, the center of Belgium's industrial region.

For upward of an hour we inched along, pygmylike, through this grim, gigantesque realm of King Steel and King Coal, before gaining the town. It was a bustling, use-before-beauty town, its shop

Photograph by Gevaert

A PASTORAL SCENE FOR AN ARTIST'S BRUSH: BELGIUM

windows crammed with evidences of prosperity, its one old-world feature, the somnolent canal, tree-shaded and flanked by cobbled quays where restaurant goers lounged over their *apéritifs* at a white spread of tables in the open air.

"Anchorage?" repeated the rough old lock keeper in answer to our queries. "Nothing safe. It's a bad town, full of strangers and thieves. They'd steal your false teeth while you were yawning. You'd better go on to Namur."

"Are there any towns en route?" I asked, as the lock doors swung open, revealing the fast-flowing Sambre. And he replied, with a French-speaking person's facility fof polysyllables:

"No towns. But there are considerable agglomerations."

For another hour or two the sight of coal dumps and factory hives of humanity accompanied us far into the countryside, while at the mouths of coal shafts, regiments of sooty-faced mine girls waved at our canvas-curtained craft, yelling jocularly, "Take us for a ride in your little barrack!"

Ten showers and a couple of downpours—a fair day's work for Belgian weather when it imitates the nation by going in for intensive production—are recorded on our log book for those eight hours, during which we vainly scanned the horizon for a "considerable agglomeration."

Meanwhile we pushed along under the high bank, with the *Nageoma* so closely curtained that nothing was exposed except two dipping paddles.

Suddenly a towline swept against our bow, almost upsetting us. We threw back the curtains, shouting, whereat a somnolent barge horse on the bank spied us. He snorted, reared, and did horrible things with the towline.

"Imbecile!" we yelled at the driver. "Hold your horse! He'll capsize us!"

The man disengaged the towline from our bow, then blindfolded the balking beast with a gunny sack.

"Pardon, *m'sieurs*," he said, removing his cap. "But this is an old war horse. He was once almost blown up by a mine, and he has never been the same since." He added in the French polysyllabic style, "To unusual phenomena he cannot become habituated."

We made a red-roofed "agglomera-

Photograph by Nels

A GIRL MINE WORKER IN THE "BLACK COUNTRY" (SEE TEXT, PAGE 536)

Up to 15 years ago the Belgian women were permitted to work in the mines. Now they can work only on the surface. More than 150,000 workers are engaged in the coal mining industry, and of that number two-thirds are employed underground. Other important industries of Belgium are sugar refineries, distilleries and breweries, the manufacture of glass, motor cars, iron and steel, lace, and artificial silk

tion," some miles beyond the shell-shocked horse, but our roamings ashore revealed no possibility of a lodging for the night. Wet, hungry, and cold, we finally poured our plight into the ear of a man we encountered on the village street. He said:

"My wife could get you a bit of dinner. As to a bed and a chance to dry out . . . well, maybe you wouldn't mind sleeping . . ."

"Not in the least!" my friend cried enthusiastically. "Please don't apologize. Anywhere at all!"

THE CANOEISTS SLEEP IN A JAIL

We dined voraciously, then were shown into a kind of barrack adjoining our friend's house. It had two bare cots, iron shutters, and looked like a garage. We slept like the dead.

Next morning, at parting, our friend inquired, "Would you mind being put down as 'homeless'?" I suppose we stared. He added, "You see, I've got to put you down as something. I'm the constable, and you've been sleeping in the jail!"

It did seem as if we had pushed the back-doors-country idea as far as one could go with propriety.

THE PRESIDENT OF THE BOAT CLUB EXTENDS A WELCOME

By that afternoon we were rounding the fortified heights where the Sambre and Meuse sweep together at Namur; and there we ran headfirst into the unexpected. The sunlit Meuse was outstrung in lanes of gaily bedecked motorboats. Parasols waved, binoculars were leveled, and cheers resounded as a row of racing shells shot by.

We had stumbled into the Front Doors Country!

We had weathered some three weeks, or 200 miles, of a purely picnicking existence; and I doubt if two dirtier, more disreputable-looking canoeists ever

Photograph by Gevaert

PREPARING FOR THE EVENING MEAL

The Flemish have always been valiant trenchermen, as is attested by many city street names in Belgium and in Flemish artists' realistic studies of groaning dinner tables (see text, page 513).

XUM

Photograph by Nels

DELIVERING MILK IN FLANDERS

baths in the locker-room. Dinner at seven, dancing at nine. Make yourselves quite at home."

Shower baths, a regatta banquet, dancing—this after weeks of rough-and-ready gipsying! Our sudden issuance from the Back Doors Country through the front doors of civilization left us dazed but far from disinclined. As we shed our old clothes, casting off therewith the memory of past discomforts, my friend chuckled:

"Some joke! If they only knew we slept in jail last night!"

That evening, when we had talked long about Belgium with the genial clubmen, one of them said the final word on the subject. We had remarked that never once during our three weeks' cruise had we heard the War discussed. He replied:

"And you won't. For us Belgians there's only one motto: Forget yesterday, work for to-morrow! We've always had to do that, wedged in as we've always been between the exchanged blows of Gallic and Teutonic races—a kind of anvil, eh?"

And the word typifies Belgium, the little, compact anvil, symbol of industry, quick to forge a valorous sword, as quick to beat it into the pruning hook of peace.

sneaked so guiltily across the pathway of a smart regatta. But at the clubhouse float, instead of our being arrested as river pirates, there stood the president waiting to welcome us!

"You're crossing Belgium in a canoe—I know," he said cheerily. "The club at Ghent wrote us to expect you. You'll room in the *concierge's* house. Shower

FERNS AS A HOBBY

By William R. Maxon

Associate Curator, United States National Herbarium

In the remarkable awakening of interest in Nature study during the last three decades ferns, oddly enough, have not received the general attention that has been accorded to other groups of plants and animals in the United States.

Books have been written about them—excellent volumes that enable the beginner in botany to know our common kinds; yet the study of ferns, and particularly their cultivation, cannot be said to have attained to anything like the widespread interest that exists in England, where for more than a half century the study and culture of ferns have amounted virtually to a hobby.

Perhaps the lag in interest on our part can be traced to a vague feeling that ferns, as a group, are hard to study and to grow; yet they are not more difficult than most plants.

In their unique attractiveness, ferns exert an appeal that is almost universal. To the poet they are the very emblem of the forest and its shade, a symbol of its cool solitude, its spirit of repose; and they draw many a tired city dweller back to distant woodlands and rocky streamsides.

Truly, in beauty of leaf, they are unsurpassed. Grace and symmetry, absolute perfection to the smallest detail in regularity of form, are their outstanding characteristics. Their variety is infinite.

In the main, fern leaves are of feathery aspect. Indeed, the Latin word *pinna*, applied to the divisions of the leaf, or frond, means feather. Thus the word "fernlike" has come to be used commonly in botany, among many different families of flowering plants, to signify a feathery quality of foliage suggestive of ferns, the highest group among the so-called flowerless plants.

FALSE "FERNS"

At this point a word may be said concerning "ferns" that are not ferns. The "Asparagus Fern," for example, known to every one who buys cut flowers, is no fern at all, but a vinelike species of asparagus (*Asparagus plumosus*), full brother to the vegetable of the same name, and not more closely related to the true ferns than is the Lily-of-the-Valley. In the delicacy of its foliage this plant is so notably fernlike that the popular misuse of the word is readily understood.

So also with the Sweet-fern (*Comptonia peregrina*), a flowering plant of the bayberry family, whose leaves are coarsely and deeply lobed, somewhat suggesting the pinnæ of the Cinnamon Fern (*Osmunda cinnamomea*).

FERNS ARE A VARIED AND AN EXCEEDINGLY ANCIENT GROUP

A large and wonderfully diverse group, with a long and ancient lineage extending far back of the flowering plants, ferns have barely managed to win against heavy odds in the ages-old evolutionary struggle.

Geographically they range from well within the Arctic Circle to the hot lowland jungles and fog-clothed mountain forests of equatorial regions. In form and habit they vary from tiny mosslike plants, a fraction of an inch in diameter, to towering tree ferns that lend distinctive character to great stretches of tropical rain forest (see pages 569, 570, and 572).

The structure of present-day ferns, their mode of living, their geographic distribution and soil preferences, their variability, and even their relationships we may know with some approach to certainty. But of the kinds that have flourished and become extinct, we shall never have the complete record—only signposts here and there in the form of fossil remains long buried (see page 586).

Nevertheless there are many volumes written about the early forms of ferns and fernlike plants that flourished in prodigious luxuriance a hundred million years ago, when they dominated the land vegetation.

Developing probably from some simple algal form, ferns had their origin far

Photograph by George R. King

UNDER THE HEMLOCKS: A VIEW IN THE ARNOLD ARBORETUM, JAMAICA PLAIN, MASSACHUSETTS

Good soil, thin shade, and protection from picnickers account for this luxuriant growth. Note that the fronds are turned to face the source of light. The ferns shown are mostly Wood-ferns (*Dryopteris*), with scattered plants of Interrupted Fern (*Osmunda claytoniana*).

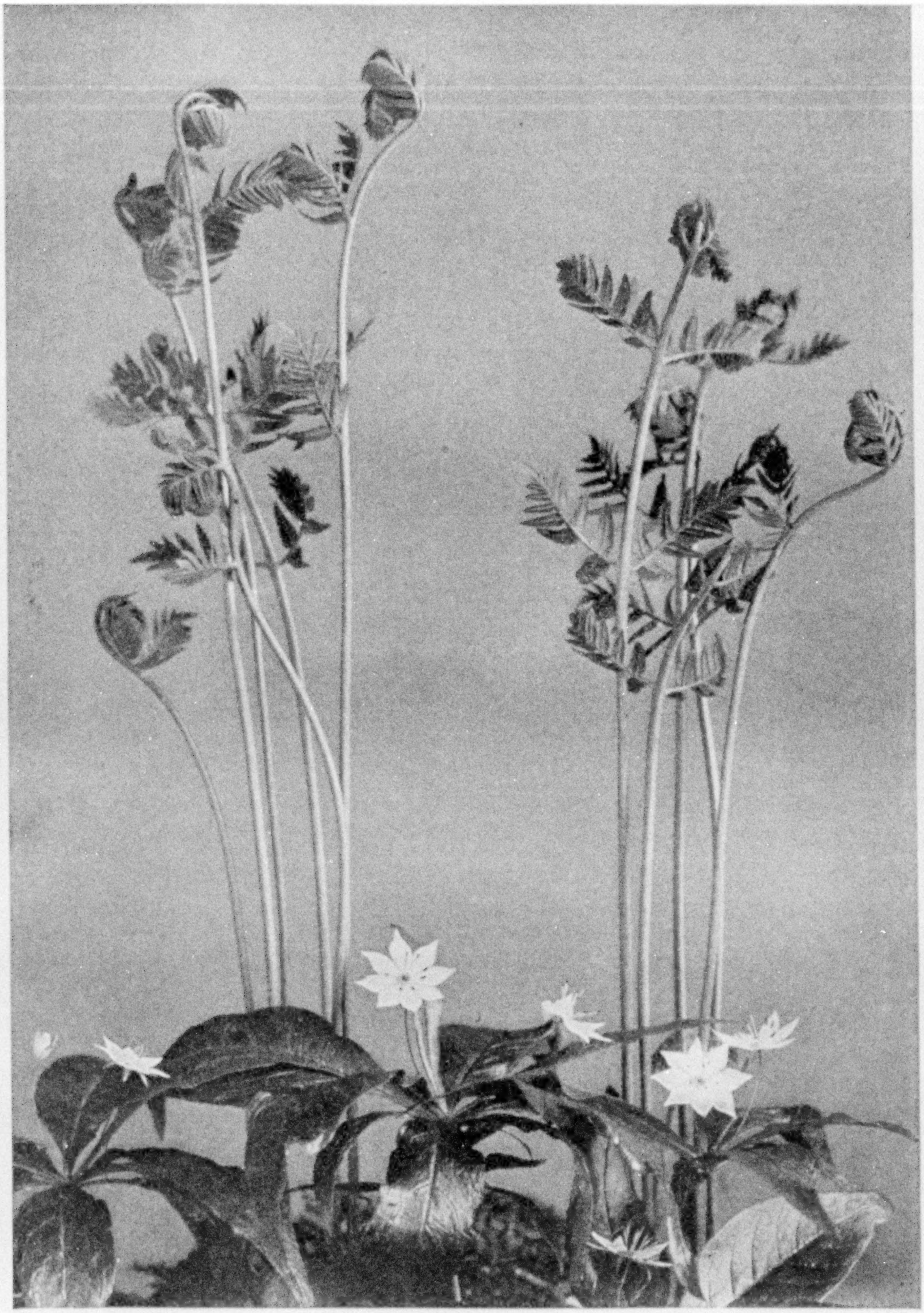
back in the Paleozoic era. They were among the first and the simplest of the larger land plants, and were extremely abundant during the Carboniferous periods.

Their solidified remains make up in large part the coal of to-day, but only a few of the fern families that contributed to these deposits now have living representatives. Among these are the Flowering Ferns (Osmundaceae), a small but distinct widespread group, and the Marattiaceae, now few in species and confined wholly to tropical regions.

By the middle of the Mesozoic era all the present families of ferns had come into existence, but with the exception of one, embracing the "true ferns" (Polypodiaceae), they have since waned steadily in number of species and in importance as the flowering plants have become more numerous and abundant.

THE TROPICS FOR FERNS

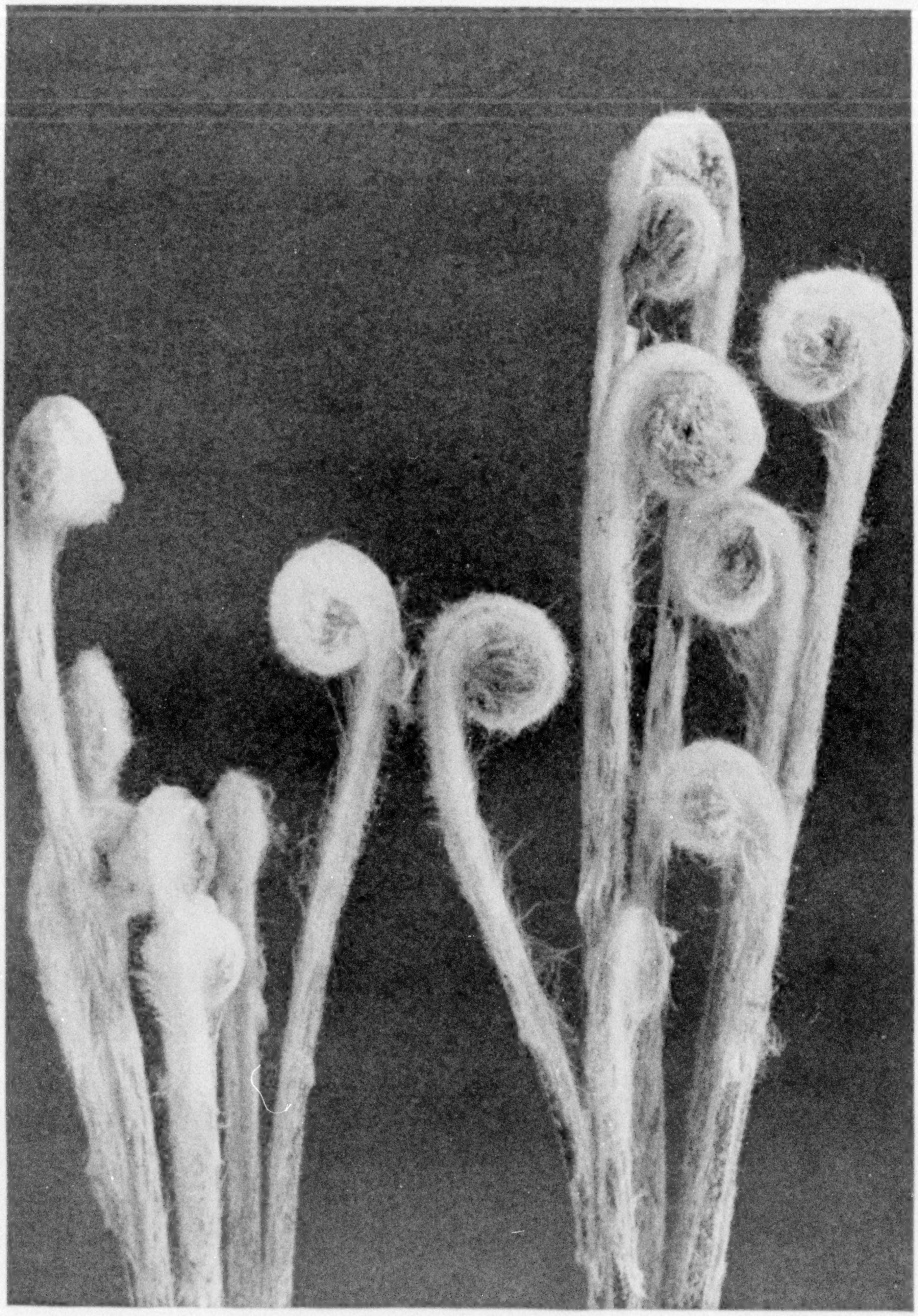
Of living ferns there are to-day not far from 8,000 known species, comprised in 12 families and about 175 genera. Their classification is a fascinating study that has engaged the attention of many noted botanists.



Photograph by Edwin Hale Lincoln

ROYAL FERNS AT A TENDER AGE

The reddish-green fronds of the Royal Fern (*Osmunda regalis*) in youth hold little promise of their stately mid-summer beauty, which is almost equal to that of the Interrupted Fern. Here and there will be found with them, at the border of moist northern woods, the Starflower (*Trientalis americana*), here illustrated.



Photograph by Edwin Hale Lincoln

"FIDDLE-HEADS"

The rusty-woolly crosiers of the Cinnamon Fern (*Osmunda cinnamomea*) are curiously like the head of a violin in shape, and this has given them a truly vernacular name. As the fronds unroll, the woolly covering sloughs off and is sought out as nest material by more than one of the smaller birds.

Photograph by Edwin Hale Lincoln

A BIT OF NEW ENGLAND SPRING

The laxly uncoiling fronds are those of the Lady Fern (*Athyrium angustum*) at an early stage, when the pink-veined flowers of the Spring Beauty (*Claytonia caroliniana*) are at their prime, as shown by the picture.

Naturally, the ferns of long-settled temperate regions are best known, yet even in Europe distinct new species are occasionally discovered. In all North America north of Mexico about 250 species are known, and the number is steadily growing as botanical exploration goes on in the Southwest and in certain parts of tropical Florida.

Notwithstanding their apparent abundance in favored northern localities, it is in truly tropical regions that ferns reach their highest development as to number of species, for here only are combined the prime requisites: heavy rainfall and equable temperatures throughout the year, with wide range in elevation.

Far from being rooted in the ground,

as in the North, more than two-thirds of the ferns of tropical forests are likely to be found on trees, many often perched far beyond reach (see pages 573 and 574).

Fern-collecting in the Tropics is thus not without its difficulties; but after one has become somewhat used to the profusion that at first wholly bewilders, has supplemented digging tools with a stout cutlass or *machete* for felling some of the smaller trees and prying ferns from the trunks of the larger ones, and, above all, has enlisted the services of a native boy for climbing, the work of collecting goes forward with a zest that is never quite matched in northern regions.

Instead of a scant 20 or 30 species to be collected in a given northern locality, here, in an area of equal size, are actually 200 or 300, and these so intermingled, so astonishingly unlike in minute detail, that the detective spirit has constant play.

The island of Jamaica, botanically well explored, boasts nearly 500 kinds of ferns, the larger island of Haiti a few more. The Andean region from Mexico to Chile has several thousand, but it will require a generation of exploration, geographical as well as botanical, before this rich flora is even approximately known.

In our own country we have in the fern flora of Florida a sort of connecting link between tropical and temperate regions.

CURIOUS FLORIDA FERNS

With a few exceptions the ferns of "tropical" Florida are species of wide distribution in the West Indies and in tropical America generally. They vary greatly in form and habit.

One of the most curious is the Grass-fern or Shoestring-fern (*Vittaria lineata*, page 579), which usually grows on the trunk of the cabbage palmetto.

But, strangest of all, even to the botanist, is the Hand-fern (*Cheiroglossa palmata*), which is actually a close ally of the Adder's-tongue (*Ophioglossum vulgatum*, Plate III), but differs in being a pendent epiphyte with thick fleshy leaves a foot or more in length, divided like a hand and bearing not one but several club-shaped fertile spikes.

This fern is nowhere very abundant in tropical America, but, oddly enough, it turns up again in the far-distant island of Réunion, off the East African coast.

Of maidenhair ferns there are three Florida species, two of special interest: Venus'-hair or Southern Maidenhair (*Adiantum capillus-veneris*, page 581), widely distributed in both the Old and New Worlds, and the Fan Maidenhair (*A. tenerum*), confined to tropical America.

From West Indian plants of the latter species has arisen that beautiful, luxuriantly leafy horticultural form known as the Barbados Maidenhair (*A. farleyense*), which is one of the finest and most decorative greenhouse ferns in general cultivation.

Our common northern Maidenhair (*Adiantum pedatum*, Plate VI) is quite as beautiful as any of these, and does remarkably well under outdoor cultivation.

OUR NORTHERN FERNS

Granted that tropical ferns are more numerous and more varied in form and in manner of growth, it is equally true that our northern kinds have a special charm that springs from familiarity with them.

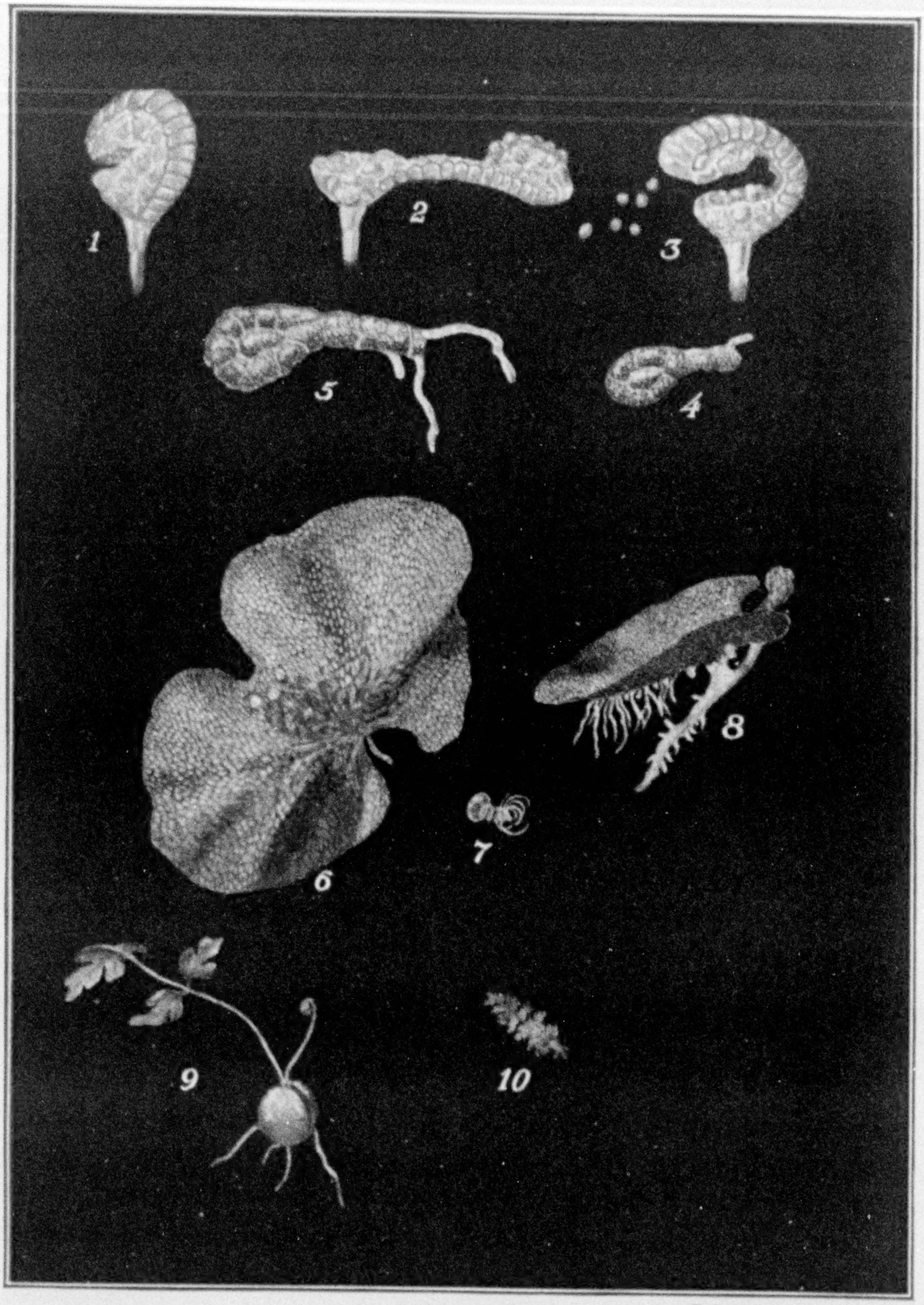
A shady limestone cliff or bowlder without its lively green cap of Polypody seems almost a failure, so used are we to its softened beauty. At every season the fresh vigor of the Polypody cheers us, the firm fronds proof against cold and drought alike. The winter woods would be bare indeed without the Christmas Fern (Plate XI) and the Marginal Fern (Plate X), both evergreen, too.

In all the Tropics you will find nothing finer than the lacy loveliness of the Gossamer or Hay-scented Fern (*Dennstedtia punctilobula*), as it grows in low, thin northern woods or in sunny openings of mountain forests.

The Common Wood-fern (Plate VIII), which of all our northeastern species is probably best known, has its own niche in our affection.

A fair share of the commoner kinds of the Northeastern States are faithfully portrayed in the accompanying colored plates, I to XVI.

Here and there in special localities in the North are a few ferns that are rare or otherwise of exceptional interest. With me the Hart's-tongue (page 565) will always hold first place, for it was the boyhood gift of two fronds of this



© Painting by E. J. Geske

HOW FERNS REPRODUCE

A single spore-case (sporangium) of a "true fern" (Family Polypodiaceae) is shown in successive stages of discharging its minute brownish spores in figures 1, 2 and 3. Figures 4, 5, and 6 represent stages in the growth of the green prothallium, or sexual plant, which develops from a single spore and bears both male and female organs. A motile male element (spermatozoid) is shown in figure 7. From a single fertilized egg cell the tiny new fern plant arises, remaining attached to the prothallium (figure 8) until large enough to lead an independent existence. Figures 1, 2 and 3 are enlarged 75 times; figures 4 and 5, 150 times; figure 6, 10 times; figure 7, 450 times, and figure 8, 8 times.

Ferns reproduce also without the agency of sex, by means of "bulblets" and buds which grow upon the leaves. Figure 9 shows (magnified two diameters) a bulblet of the Bladder Fern (see under Plate XVI) with young plant attached. Figure 10 shows at natural size a bud of the Soft Holly-fern, developing a little plant.

Frond two-thirds natural size

© Painting by E. J. Geske

RATTLESNAKE FERN (*Botrychium virginianum*)

This belongs to a family (Ophioglossaceae) quite unlike the "true ferns" in structure and in methods of spore production. Surmounting the lacy sterile blade is a long-stalked "fruiting" panicle, from which the powdery, pale sulphur-yellow spores are shed in the utmost profusion. A cluster of partly open, purselike sporangia is shown above, magnified about 45 times. After the spores are shed both stalk and sporangia shrivel and nearly disappear.

Fronds slightly reduced

© Painting by E. J. Geske

ADDER'S-TONGUE (*Ophioglossum vulgatum*) AND CLIMBING FERN (*Lygodium palmatum*)

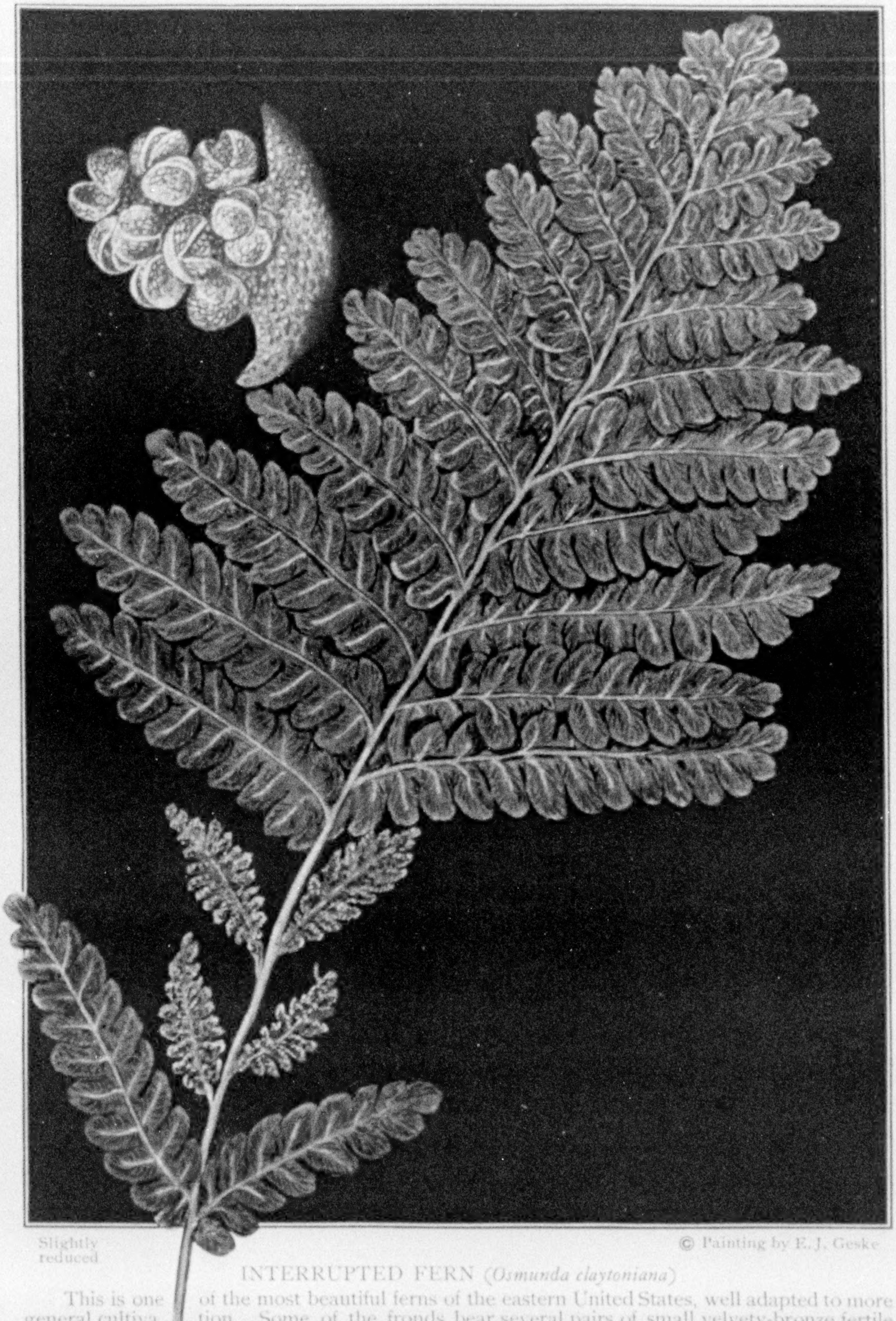
The Adder's-tongue (at right) is allied to the Rattlesnake Fern, but has a simple entire sterile blade and the sporangia fused in a tongue-like stalked spike, as shown in the upper detailed figure. The Climbing Fern (at left) is the only one of its kind native to the United States. The detail at left shows the overlapping scales of a fertile segment. A single sporangium, with hard elastic cap, is shown in the middle, magnified 50 times.

Frond one-half natural size

© Painting by E. J. Geske

ROYAL FERN (*Osmunda regalis*)

To the sportsman this swamp fern is familiar for its clear yellow locust-like foliage in autumn. The green spores have been shed months before, and the sporangia, too, have long since withered. A cluster of nearly empty sporangia is shown above, magnified 30 times, with a single spore at the right, magnified about 400 times.



Slightly reduced

© Painting by E. J. Geske

INTERRUPTED FERN (*Osmunda claytoniana*)

This is one of the most beautiful ferns of the eastern United States, well adapted to more general cultivation. Some of the fronds bear several pairs of small velvety-bronze fertile pinnae, which at first are surcharged with green spores but later wither to brittle brown remnants. A cluster of sporangia, enlarged 30 times, is shown above.

Frond one-half natural size

© Painting by E. J. Geske

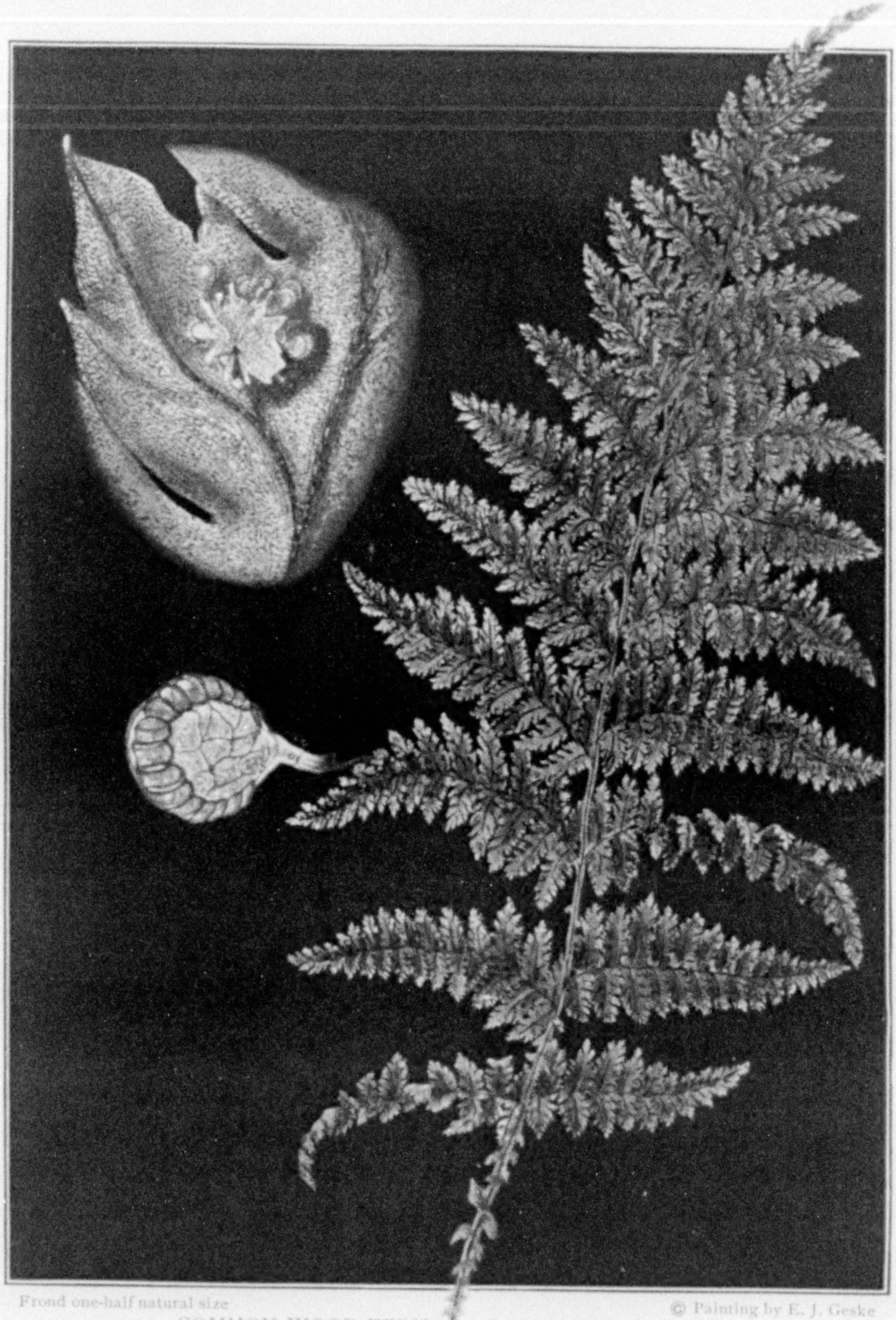
MAIDENHAIR (*Adiantum pedatum*)

The most graceful of our commoner native ferns, well marked by its shining purplish-brown stalks, delicate segments, and method of "fruiting." The lower detail, magnified 12 times, shows the sporangia partly covered by the reflexed lobe of the leaf margin. At the right is an unopened sporangium, magnified about 75 times.

Frond one-third natural size — © Painting by E. J. Geske

BRACKEN (*Pteridium latiusculum*)

This and closely related forms of world-wide distribution are among the useful ferns, serving, for example, as food for man and beast. The triangular blade is often three feet broad. The magnified detail shows the hairy under side, with the delicate indusium arising from the recurved margin, from beneath which the sporangia eventually emerge in a heavy brown line.

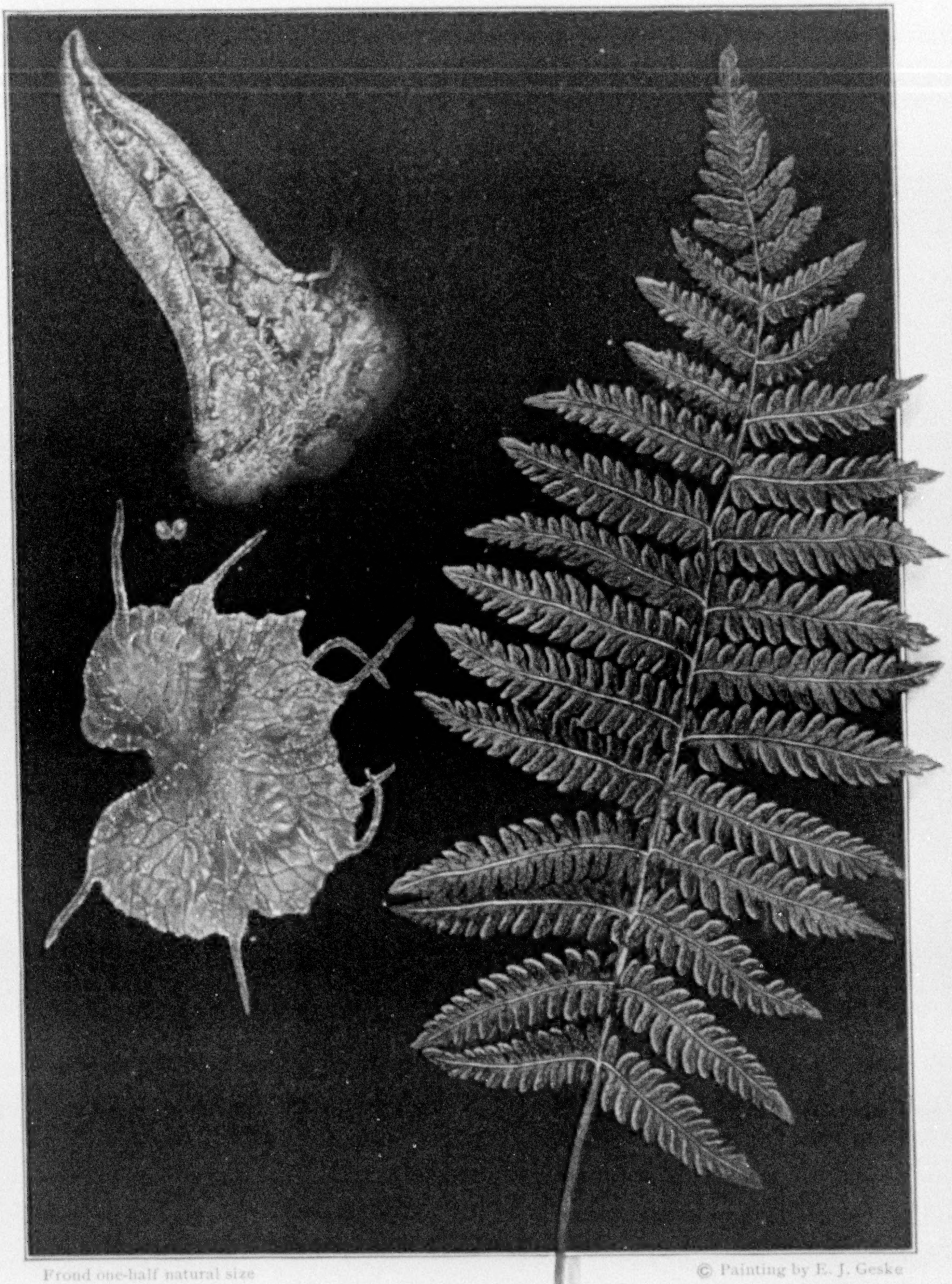


Frond one-half natural size

© Painting by E. J. Geske

COMMON WOOD-FERN (*Dryopteris intermedia*)

The so-called Fancy Fern of the florists, sold in great numbers with carnations and other cut flowers. A ripe sporangium, magnified 75 times, and a detail of the leaf segment with sporangia and indusium are shown at the left. The fronds are evergreen and of firm texture.



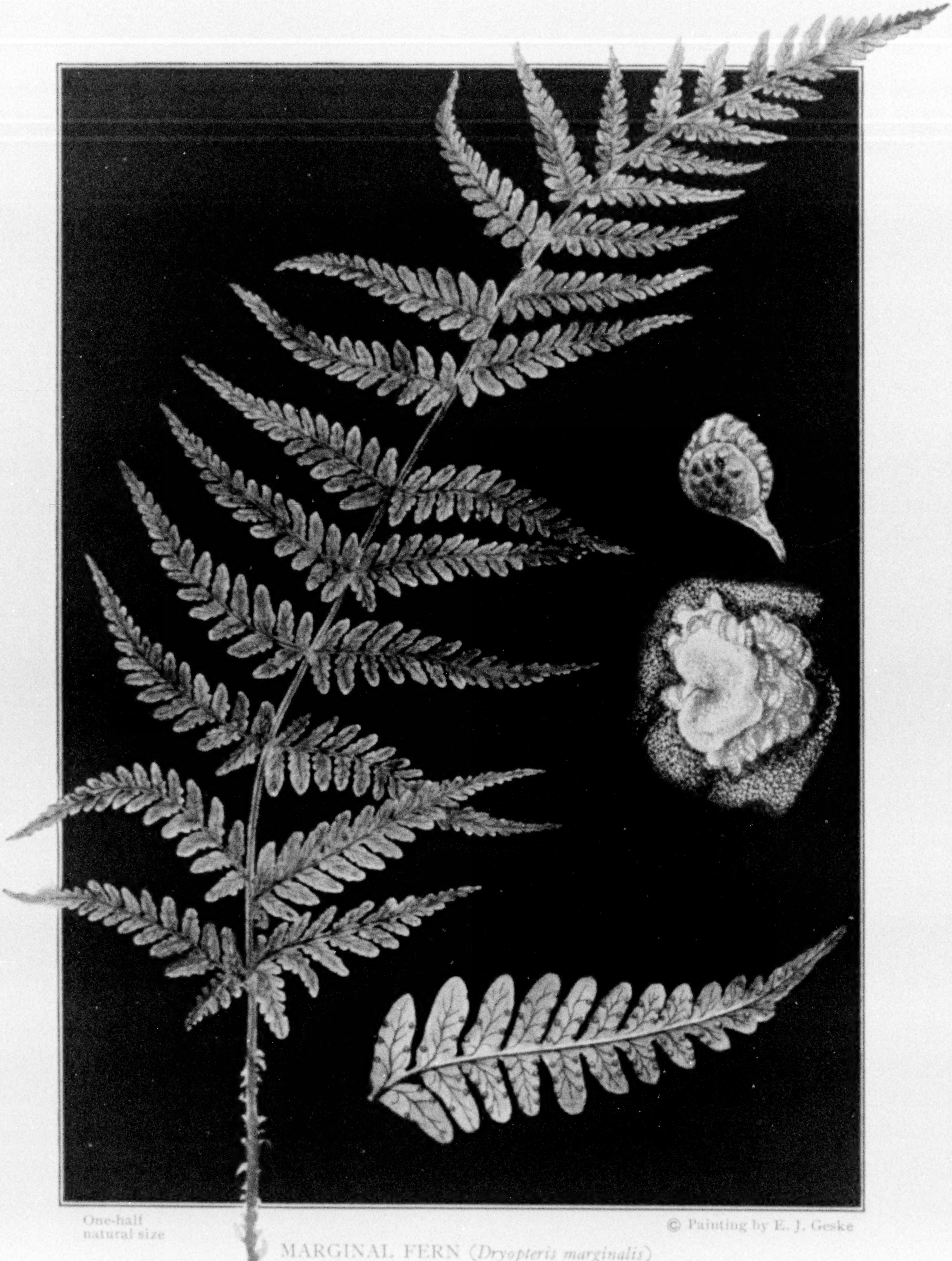
Frond one-half natural size

© Painting by E. J. Geske

MARSH FERN (*Dryopteris thelypteris*)

This ubiquitous fern of marshy meadows varies greatly according to sunlight. An in-rolled fertile segment is shown above. The detail at lower left, greatly enlarged, shows one of the delicate translucent indusia, which cover the heaps of sporangia and protect them until maturity.

XUM

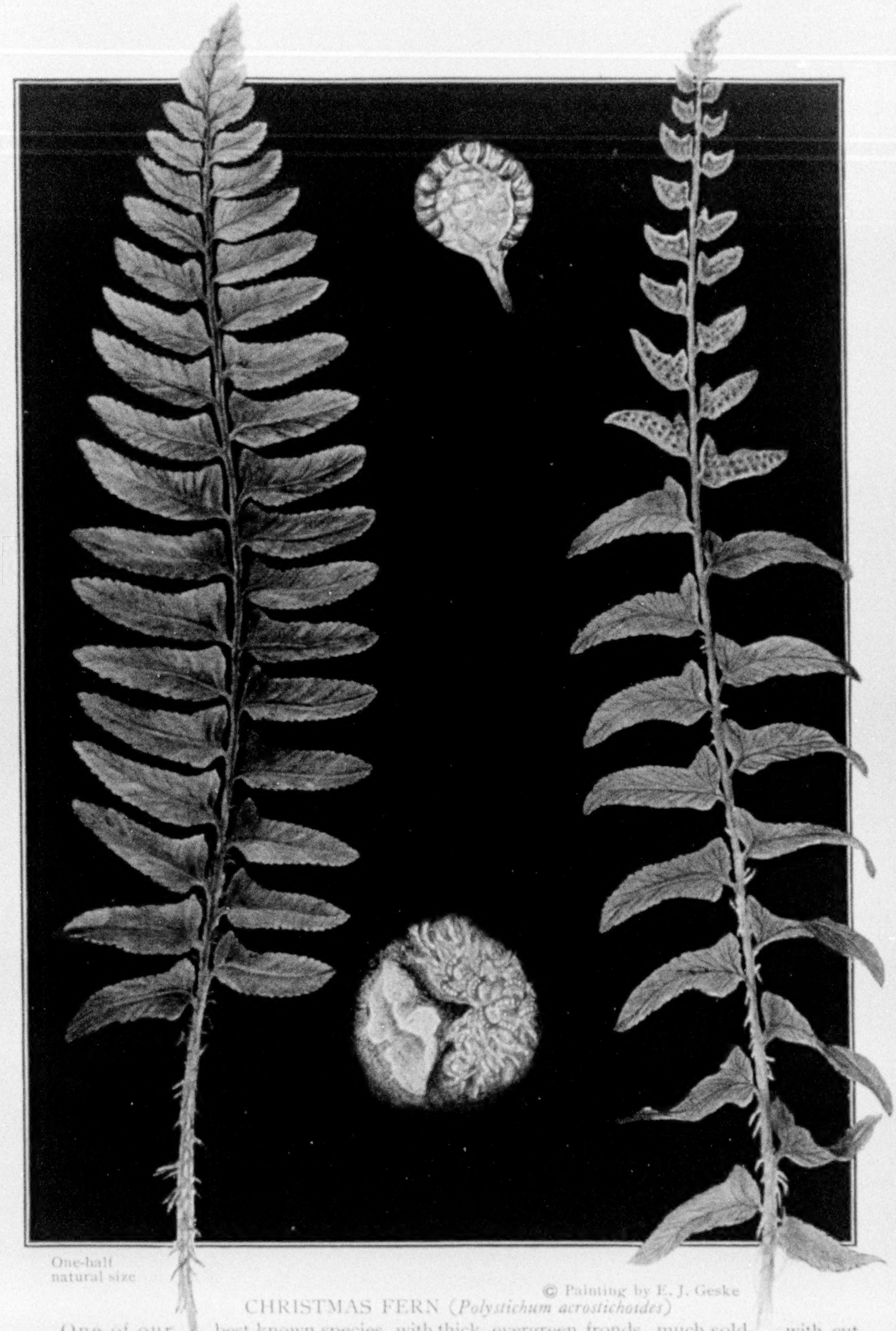


One-half natural size

© Painting by E. J. Geske

MARGINAL FERN (*Dryopteris marginalis*)

This fern is not often found far away from loose rocks in rich, shady woods. The fronds are blue-green, leathery, and evergreen. The pinna at lower right shows the under side and the marginal position of the sori. An enlarged sorus (fruit dot), with indusium, and a ripe sporangium are shown above.



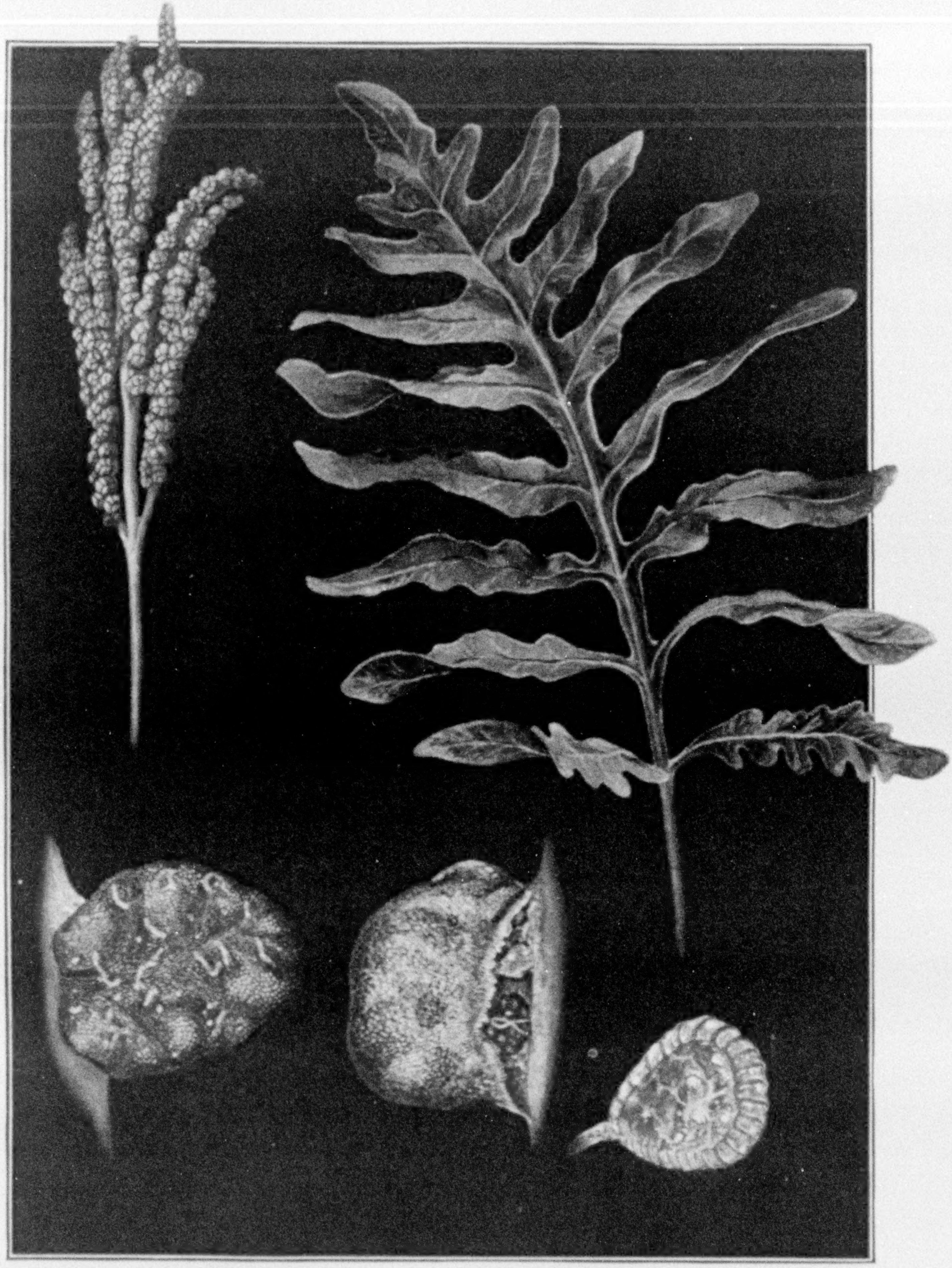
One-half natural size

© Painting by E. J. Geske

CHRISTMAS FERN (*Polystichum acrostichoides*)

One of our best known species, with thick, evergreen fronds, much sold with cut flowers under the name Dagger Fern. Some of the fronds have contracted tips, with close-set sori covering the under side of the pinnae. A sorus, with shriveling parasol-like indusium, is shown at bottom; a ripe sporangium above.

XUM

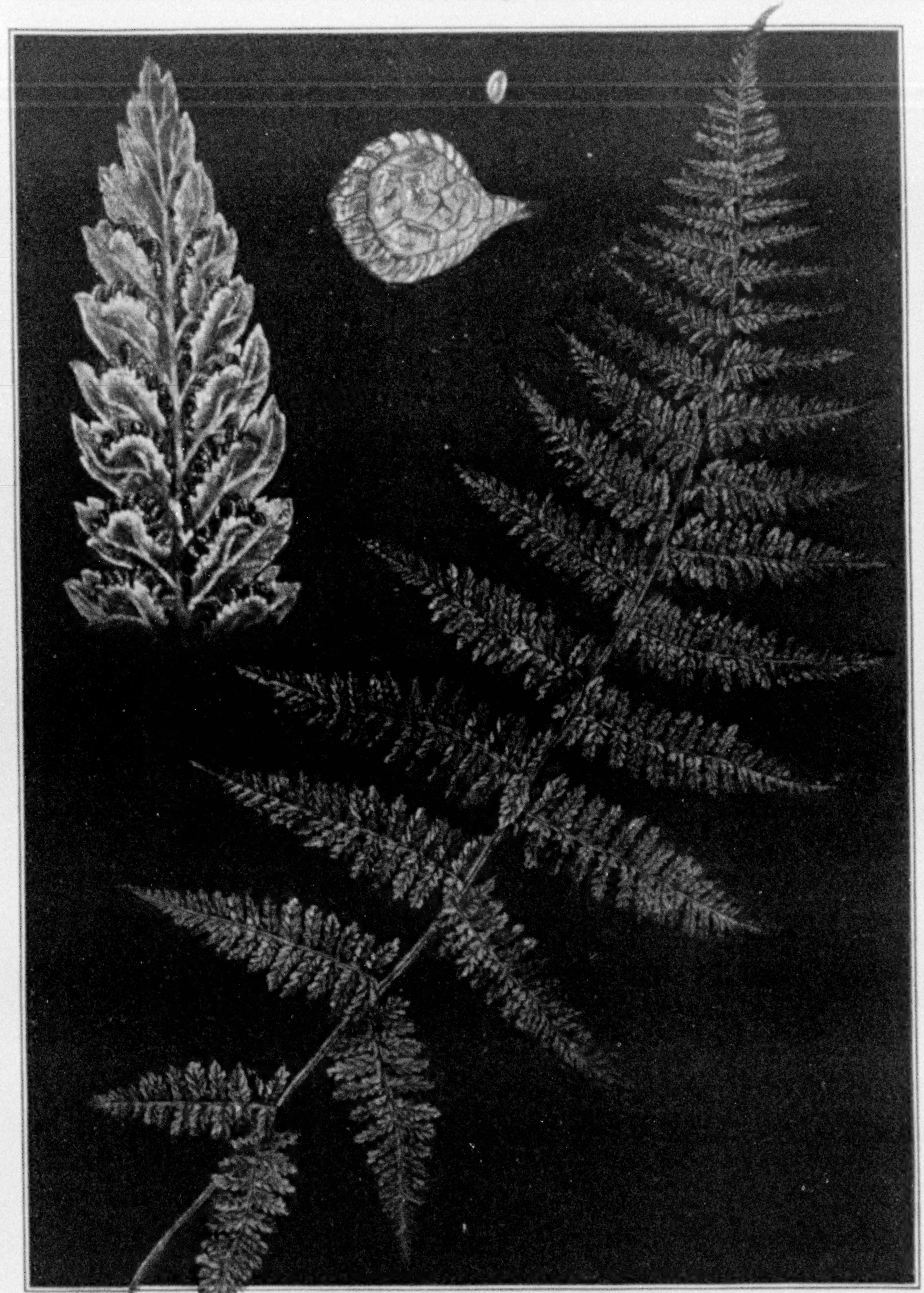


Fronds somewhat reduced

© Painting by E. J. Geske

SENSITIVE FERN (*Onoclea sensibilis*)

A normal fertile and a sterile frond, the latter smaller than usual. Two distended berry-like fertile segments containing the sporangia are shown below, magnified 10 times, and a single ripe sporangium, magnified 60 times.

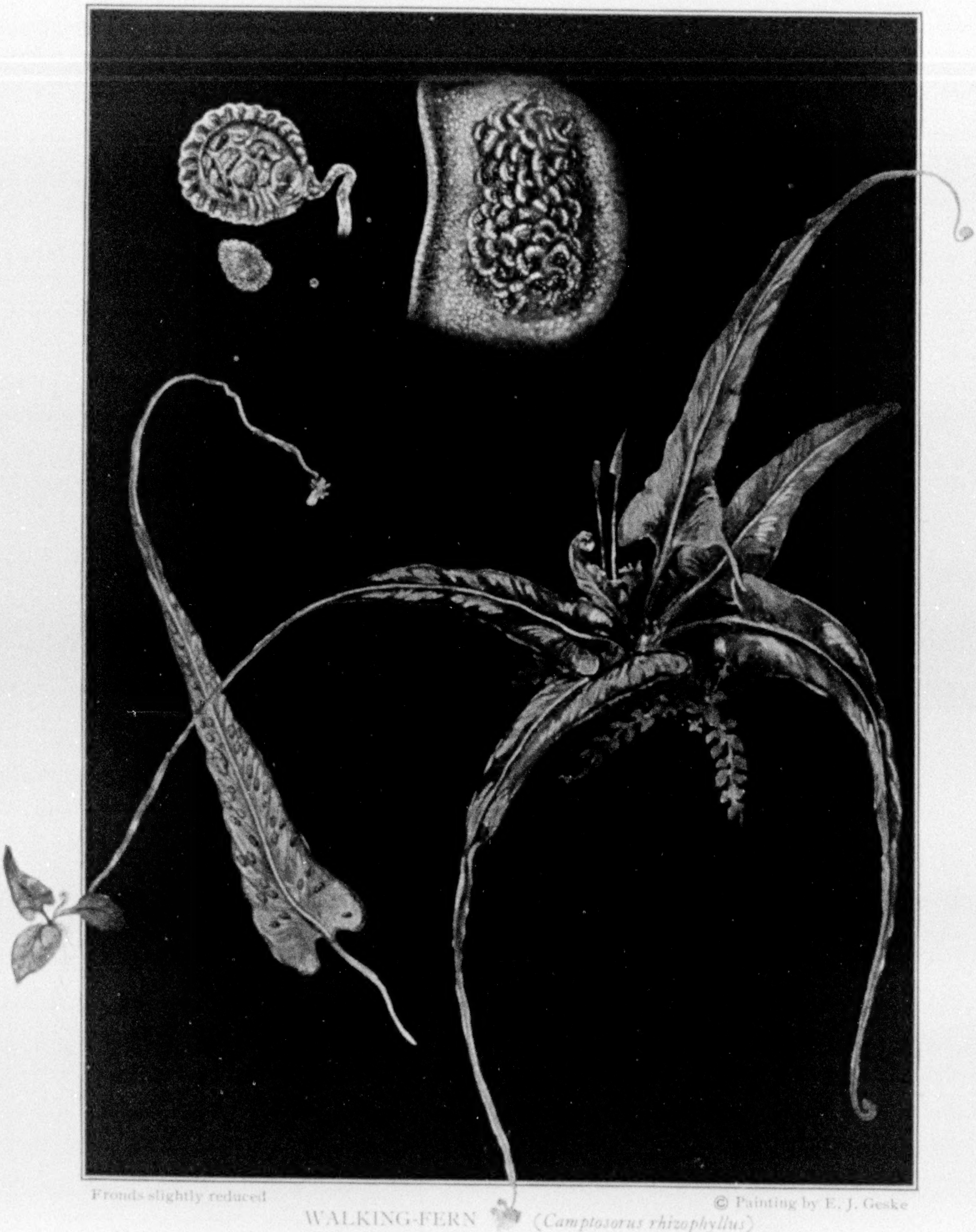


Frond one-third natural size © Painting by E. J. Geske

EASTERN LADY FERN (*Athyrium angustum*)

This is one of the most variable of Eastern ferns. A segment of a pinna, with double row of curved sori and indusia, is shown at upper left (magnified 5 times). A ripe sporangium and single spore are also shown.

XUM

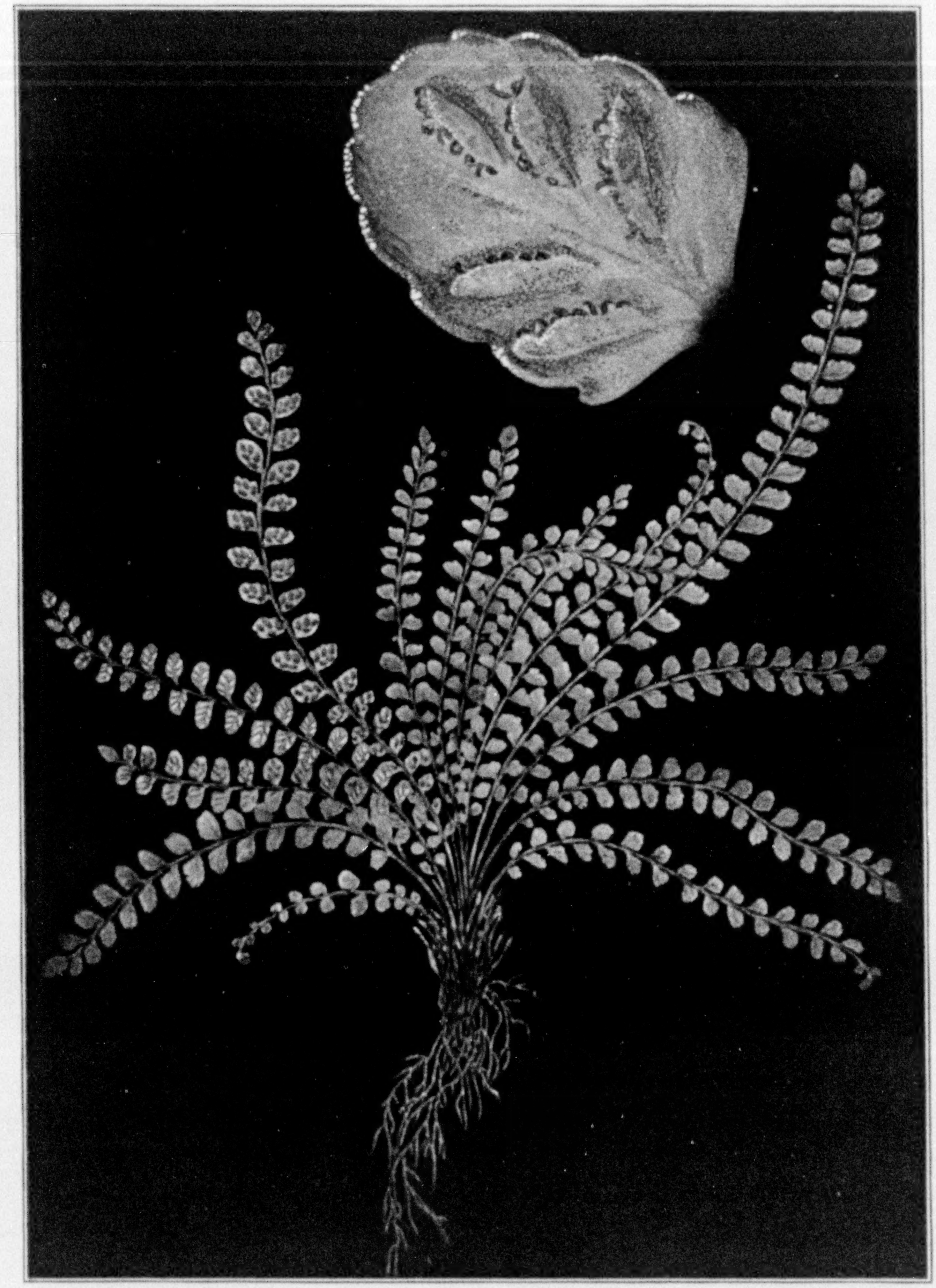


Fronds slightly reduced

© Painting by E. J. Geske

WALKING-FERN (*Camptosorus rhizophyllus*)

Unique, among our Northeastern ferns, not only in the shape of its glossy, blue-green fronds, but in the habit of bearing young plants at their slender tips. A sorus is shown at upper middle, magnified 15 times, with a ripe sporangium and a delicately winged spore at left.



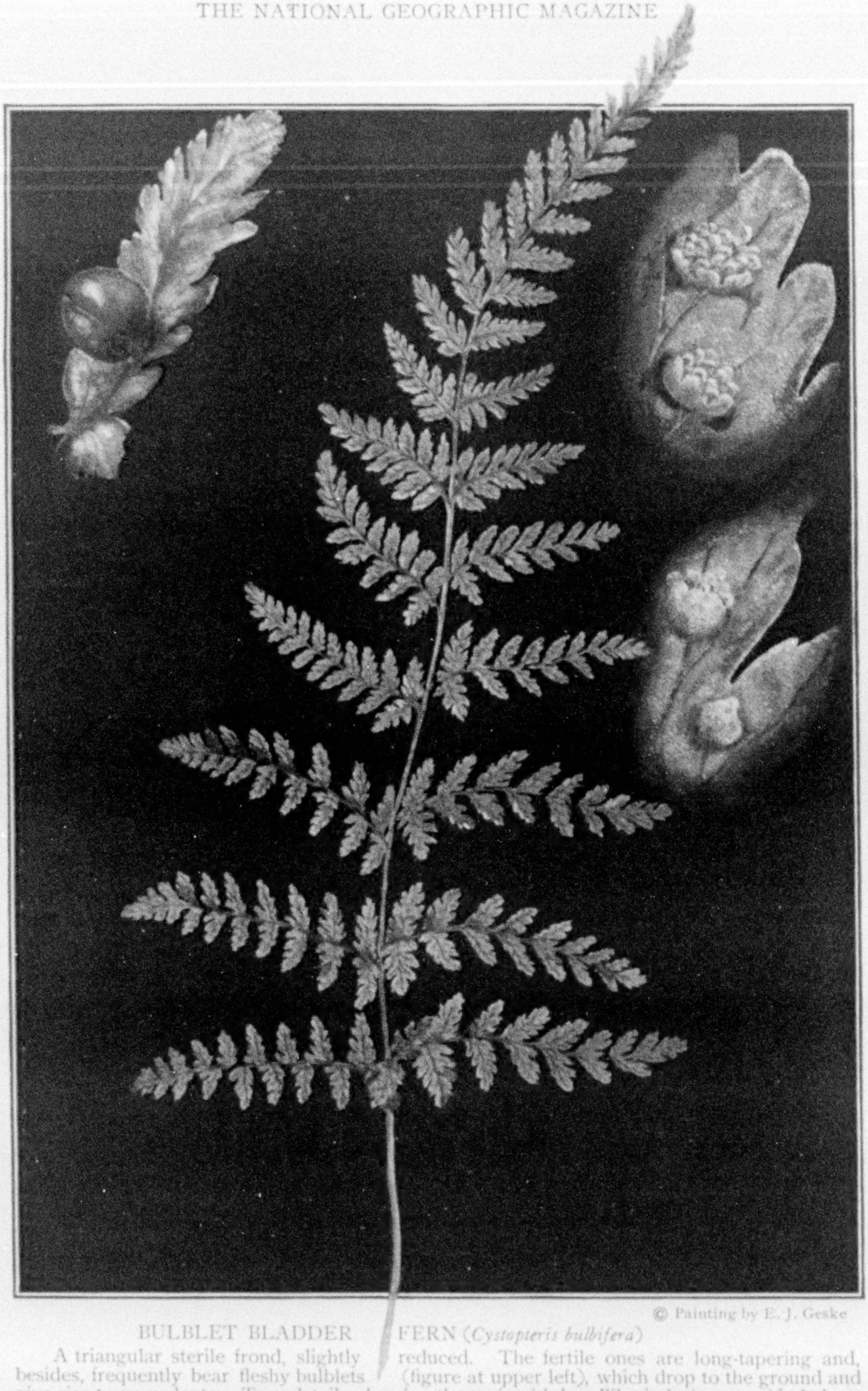
Plant slightly reduced

© Painting by E. J. Geske

DWARF SPLEENWORT (*Asplenium trichomanes*)

This daintiest of North American ferns inhabits moist, shady cliffs, often in company with the Walking-fern, with fronds spread in the form of a rosette. A pinna with young sori is shown above, magnified about 10 times.

XUM



© Painting by E. J. Geske

BULBLET BLADDER FERN (*Cystopteris bulbifera*)

A triangular sterile frond, slightly reduced. The fertile ones are long-tapering and, besides, frequently bear fleshy bulblets (figure at upper left), which drop to the ground and give rise to new plants. Two details showing the sori, with hoodlike indusia, magnified about 20 times, are given at the right.

remarkable plant that first excited my interest in ferns and sent me scurrying over the limestone hills of central New York to the picturesque gorge of Chittenango Creek, where it grew.

The thrill of discovery, of handling and possessing the thick, glossy fronds, so unlike those of any other native fern, the eerie quiet of the chasm itself, the odor of crushed Herb Robert—all seem as vivid now as many years ago.

Another great rarity is the Curly-grass (*Schizaea pusilla*, page 567). Hidden away in the pine barrens of New Jersey, this tiny cousin of the Climbing Fern (*Lygodium*) flourishes amazingly. It is a stranded relic of a past age, when tropical plants grew far to the north.

FERNS OF THE SOUTHWEST

In many respects out-and-out desert ferns seem the most remarkable of all.

Except for a few of the cliff-loving kinds, northern ferns as a rule live in cool, shady situations, or at least where there is a generous supply of water throughout the year. How different are conditions in the arid mountain ranges and foothills of the Mexican border region! Here drought is perennial and shade is rare. In consequence, the ferns have managed to survive only by adapting themselves in remarkable ways to the severe conditions.

In general, desert ferns seek the shelter of seams and clefts in the rocks, where the soil is occasionally moistened by temporary rills, and nearly all have put on a dense undercovering of wax, close-set hairs, or overlapping scales, thus enabling them to retain their water, without which growth could not go on (see page 578).

The enormous length of time required for the evolution of these protective structures is quite beyond our comprehension. As a further aid, most desert ferns have the habit of rolling up their fronds during the driest periods. When the rains do come, the shriveled blades quickly expand and growth begins again (pp. 576-577).

THE FILMY FERNS

Contrasting sharply with the thick-leaved ferns of arid regions are the Filmy Ferns (Hymenophyllaceae), an extensive group found mainly in the cool, cloud-drenched mountain forests of tropical regions, where there is a constant supply of water. They grow mostly upon logs and mossy tree trunks. A few kinds occur in the lowlands, on trees and banks, or clinging to moist rocks, and some five species are found in the Southern States.

One of these (*Trichomanes petersii*, page 566) is our smallest fern, a veritable midget, its closely overlapping fronds barely a half-inch long. It grows in the spray of waterfalls or on wet shady ledges of sandstone, and from its small size and peculiar habit of growth must often be mistaken for a moss or liverwort. More typical of the group is the Kentucky Filmy (*T. boschianum*, page 566), also a dweller upon sandstone.

The forms of leaf assumed by the "filmies" are legion, ranging from simple or coarsely lobed to many times finely divided, the divisions flat or ruffled, devoid of hairs or so thickly covered with them that they glisten with a silvery, golden, or warm-brown silky sheen. Some kinds grow stiffly erect, but the more beautiful are those that hang limply from the mossy trees.

All are alike in having leaf tissue but one cell thick, which explains their liking for spray and mountain fogs. They have no means of storing water. A few can live where it is merely damp, but most kinds can not let their delicate fronds dry out, if life is to go on. The covering of hairs is commonest in species of drier or more exposed situations. It protects the fronds by harboring a thin film of water over their surface.

With few exceptions the Filmy Ferns are plants of extreme delicacy, and their translucent, lacelike fronds are among the most beautiful of natural objects.

TREE FERNS

The largest of all ferns are, of course, the Tree Ferns (*Cyatheaceae*). They are the glory of the Tropics. Not one grows naturally in continental United States, but in Porto Rico, the Hawaiian Islands, and the Philippines they occur widely from sea-level to the higher mountains and are especially common wherever "filmies" abound. There are a few small kinds, hardly larger than our Wood-ferns, in which an upright trunk is not developed; but in general their stems are rigidly erect and treelike, 20 to 40, 60, or possibly 80 feet high, surmounted by a

XUM

Photograph from Freeman Art Company

A SUNLIT SPACE AMONG THE CALIFORNIA REDWOODS

The stately beauty of these forest giants is not lessened by the lush growth of Western Sword Ferns at their feet. This species (*Polystichum munitum*) is related to the Christmas Fern, but grows to twice its height. It is abundant from Alaska to the Golden Gate.

Photograph by H. E. Ransier

THE HART'S-TONGUE, RAREST AND MOST CURIOUS OF OUR NORTHEASTERN FERNS

In the United States this interesting plant, except for a small colony in Tennessee, is confined to a few shady rock slopes in central New York. It is abundant in parts of Europe, and is there called the most variable of all ferns. More than 100 varieties are recognized, these with fronds so ruffled, lobed, divided, split, or branched and repeatedly subdivided that they offer but faint resemblance to the simple strap-shaped fronds we know. The broad-leafed plant is Wild Ginger (*Asarum*) (see page 546).

palmlike crown of huge dissected fronds. The Australians call these Fern Trees, certainly an appropriate name.

THE CULTIVATION OF FERNS

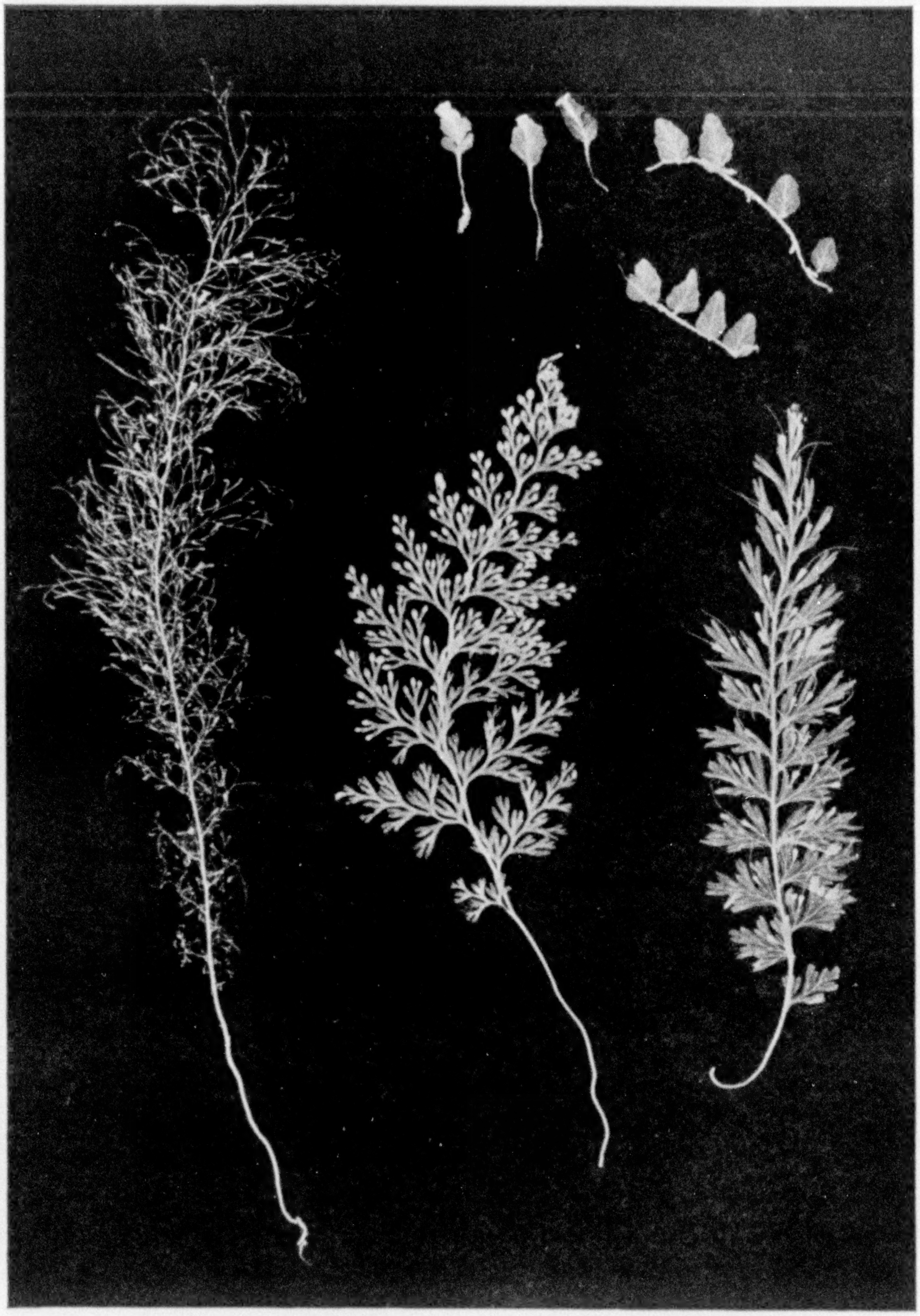
In England the culture of ferns, both native and exotic, has progressed to an extent not appreciated in America. The great collection of living ferns at the Royal Botanic Gardens of Kew, numbering nearly 300 different species, dates from the last of the 18th century, and includes plants from nearly all parts of the world. Its influence in stimulating the cultivation of ferns as a hobby has doubtless been very great.

A recent illustrated catalogue of a British dealer lists fully 2,000 species and varieties. Hundreds of the forms offered are tropical plants that must be grown under glass at temperatures ranging from 45 to 75 degrees, but hundreds of others, classed as hardy, are from temperate regions and are well able to withstand an ordinary northern winter out of doors. Many are "freak" forms, with ruffled, crested, or irregularly divided foliage, which for interest have sometimes been likened (on this side of the Atlantic) to seven-toed kittens and two-headed rabbits.

OUTDOOR FERNERIES AND ROCKERIES

In planning an outdoor fern garden and rockery there is a chance for every bit of ingenuity and attention to detail one can muster. With due care ferns may be transplanted at any time of the year, though naturally with least success in late spring, when the leaves are still tender and not fully developed. Midsummer is a good time, for then the plants are at mature height and can be grouped to best advantage.

Most ferns will prefer a moderately moist, well-drained soil, in partial shade—a northward exposure is usually best. If the soil is heavy, sand and leaf peat should be worked into it. Recently the soil



Print from U. S. National Museum

SOME "NATURE PRINTS" OF FILMY FERNS

The "filmies" are legion and are extremely diverse in form. Four species are here shown: at top, *Trichomanes petersii*, one of the smallest ferns in the world; at right, the Kentucky Filmy (*Trichomanes boschianum*); in the center, *Hymenophyllum polyanthes;* and at left, *Trichomanes capillaceum*, the last two common in tropical America. The prints are natural size and are made by exposing the fronds on sensitized paper in an ordinary printing frame. Blueprint paper gives good results (see page 563).

preferences of nearly all our northeastern ferns have been worked out carefully.* It is found that in general ferns appear to thrive best in moderately acid or "circumneutral" soil.

For rock ferns a miniature cliff or rugged slope may be laid up against the foundations of the house, using irregular rocks of varying size and bedding them with moist earth. Drainage will be ample, but great care must be taken to make the earth pockets of adequate depth and size.

INDOOR FERNS

Those who love ferns as house plants soon come to know their need for regular watering, moderate temperature, and ample sunlight, and the necessity also for occasional repotting and the application of a little fertilizer. They find perpetual delight in the response of the plants to tender care.

For growing indoors, ferns taken directly from the woods are rarely satisfactory. Plants bought from a florist are far better, for these have been selected and raised for the purpose.

For table use the Maidenhairs, of which a few kinds are obtainable, are less satisfactory than small Holly-ferns (*Polystichum* and *Cyrtomium*), on account of their delicate texture. Several varieties of the Cretan Brake (*Pteris cretica*) and the Spider Brake (*P. multifida*) are much used for this purpose, and they serve admirably also as potted house plants.

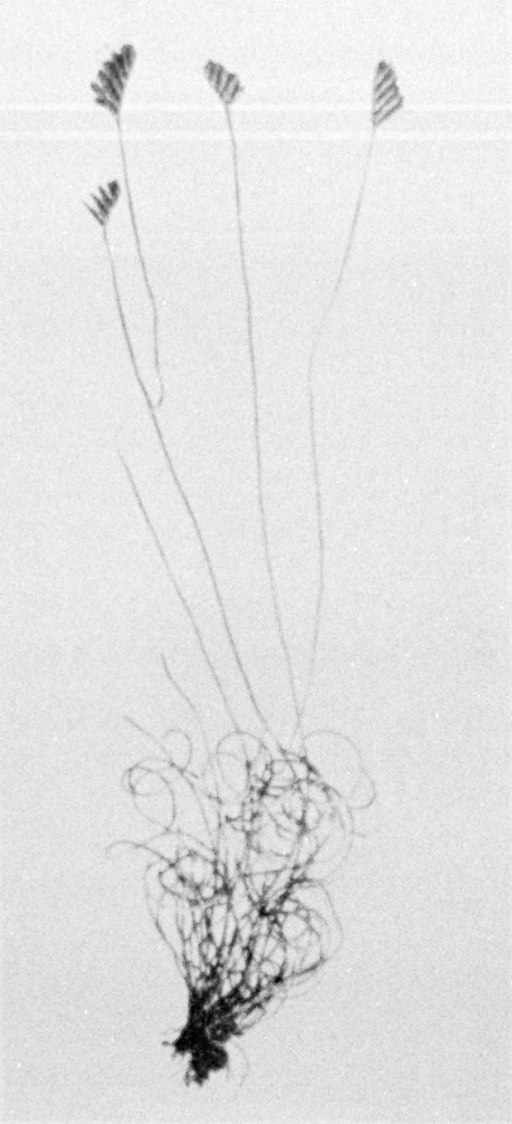
But the best and most popular of all ferns for general house culture are the Boston Fern (*Nephrolepis exaltata bostoniensis*) and its very numerous horticultural varieties. These have almost supplanted other kinds. Indeed, the rise in popularity of the Boston Fern and its varieties, their history, and their well-deserved commercial importance make one of the most remarkable chapters in the annals of American horticulture.

THE BOSTON FERN AND ITS OFFSHOOTS

The parent form of the Boston Fern is the Sword Fern (*Nephrolepis exaltata*), common in Florida and the Tropics, which was first introduced into cultivation in 1793, from Jamaica. Eventually it became one of the common greenhouse ferns, and was not noted for variability.

But about 30 years ago, a florist near Boston found among his Sword Ferns a new sort, with softer, more graceful, and more numerous leaves. This variety, which is believed to have arisen as a sport from the Sword Fern, came to be known as the Boston Fern. It grew rapidly in public favor and at the end of a few years hundreds of thousands were being sold annually by florists throughout the United States.

The plants were "thrifty," tolerant of

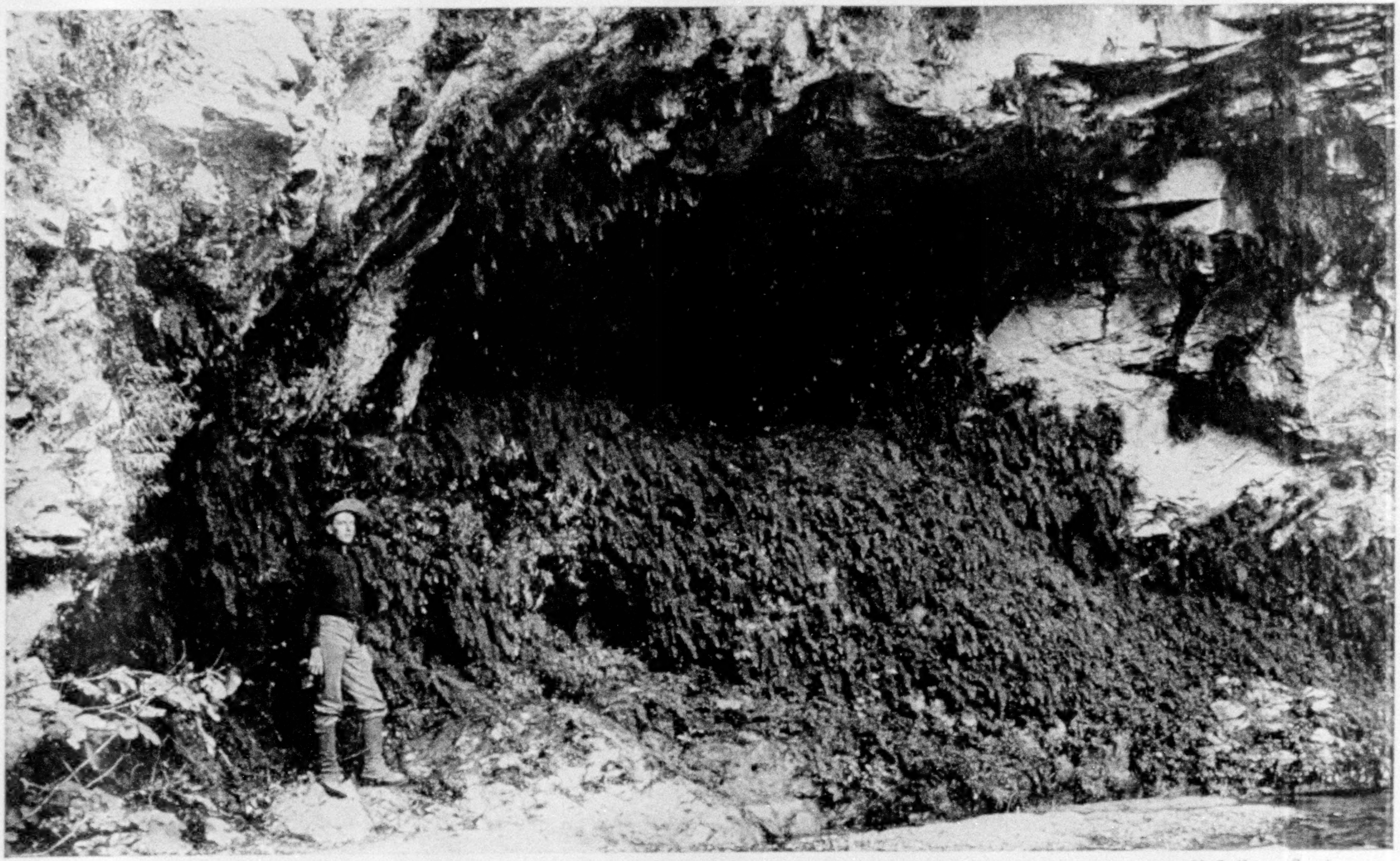


Photograph from U. S. National Museum

THE "CURLY-GRASS" (*Schizaea pusilla*), QUAINTEST OF OUR NATIVE FERNS

It hides away in the New Jersey pine barrens and seems more like a grass or a diminutive sedge than a fern. The fertile spikes, lifted high above the rosette of contorted sterile fronds, discharge their spores in autumn. (Natural size.)

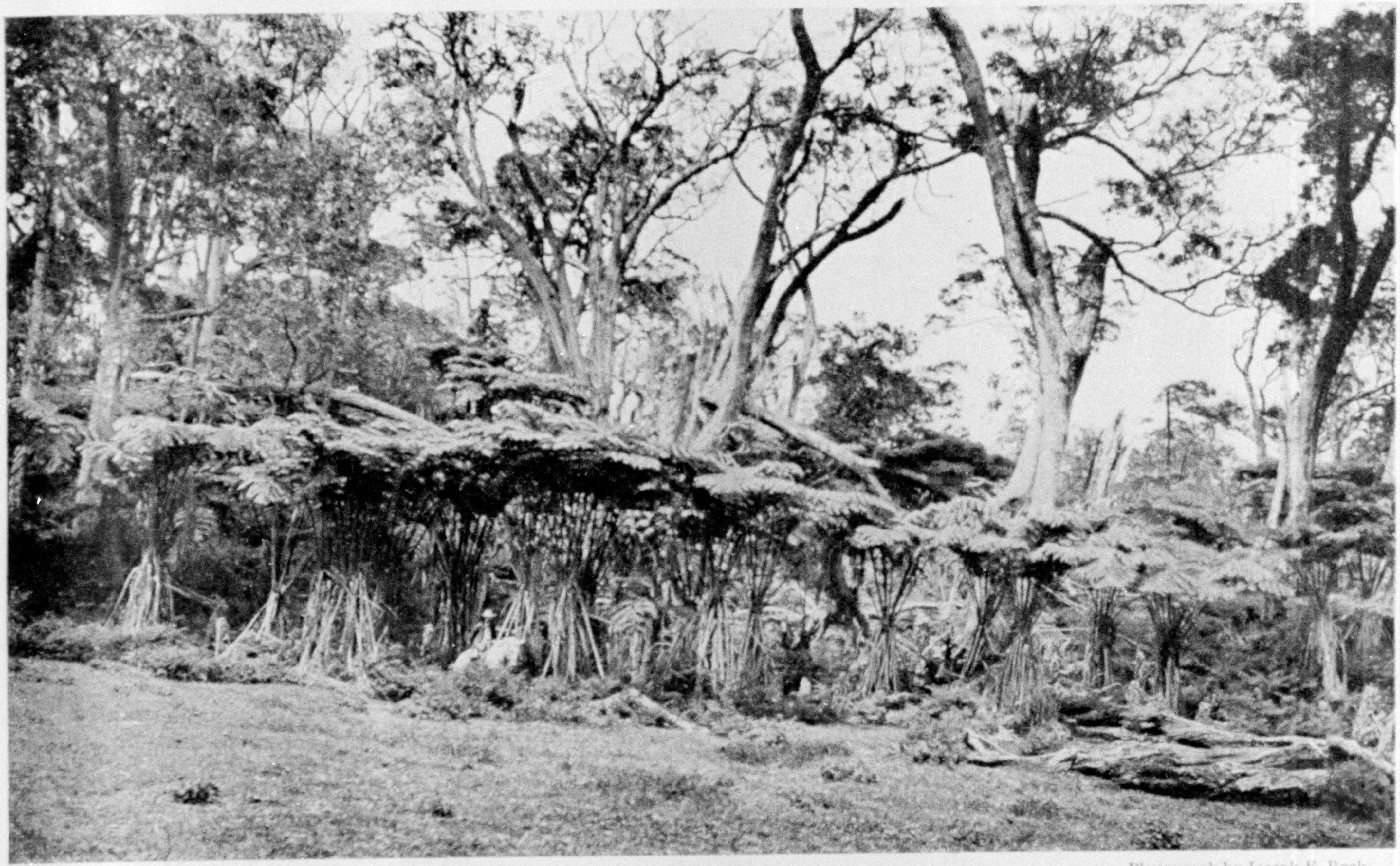
* Wherry, E. T. Soil Acidity: Its Nature, Measurement, and Relation to Plant Distribution. In Smithsonian Report for 1920, pp. 247-268, 1922.



Photograph courtesy U. S. Forest Service

A FERN-COVERED BLUFF IN THE ANGELES NATIONAL FOREST, CALIFORNIA

The Maidenhair has taken complete possession of this shallow cavern, seeking out every nook and cranny that will harbor its tenacious roots.

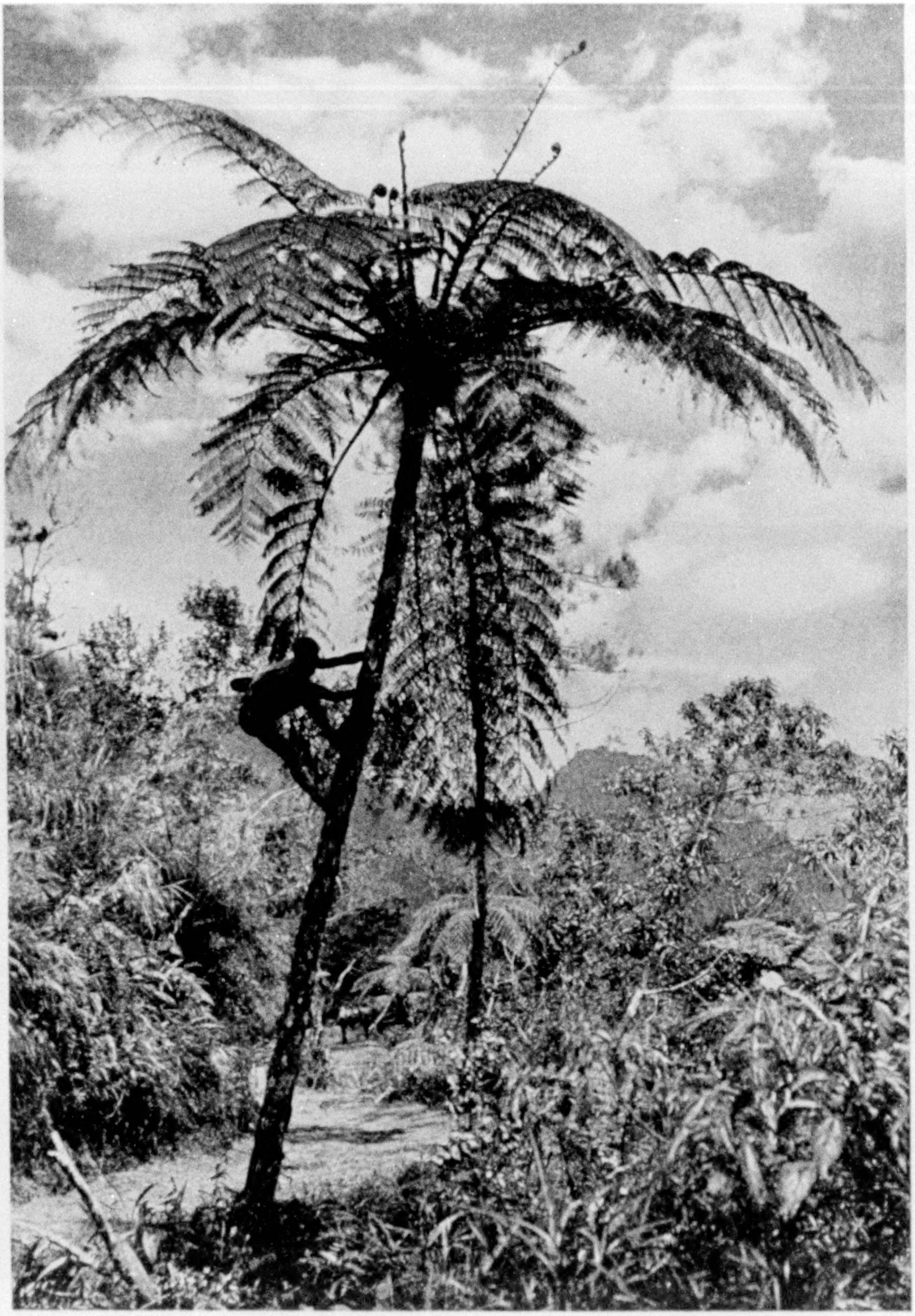


Photograph by Joseph F. Rock

ON THE LOWER SLOPES OF MAUNA LOA, ISLAND OF HAWAII

The Tree Ferns (*Cibotium chamissoi*) form a dense grove in the partial shade of towering forest trees. The horse and rider provide the scale.

XUM



Photograph by Charles Martin

A TREE FERN ON THE CERVANTES-TAGUIDÍN TRAIL, MOUNTAIN PROVINCE, LUZON, PHILIPPINE ISLANDS

In tropical regions the trunks of Tree Ferns are frequently split and laid end to end to make trails through swampy and otherwise nearly impassable forests. Tree Ferns are also used for telegraph poles and as building timbers.

FERNS IN SHERBROOK GULLY, VICTORIA, AUSTRALIA

The Tree Ferns along the water's edge are *Dicksonia antarctica*, a species native to Australia and Tasmania. It is rather commonly cultivated in botanical gardens.

ordinary conditions within doors, and easily cared for. Also they were uniform all over the country.

Then the Boston Fern started on its mad career. Almost simultaneously there appeared in widely separated greenhouses, among the many thousands of normal young Boston Ferns, an even half-dozen plants which differed strikingly in several ways, especially in having the pinnæ dwarfed, ruffled, or again divided in the form of miniature fronds.

The horticultural value of these sports was evident enough. They were at once multiplied, and from that time to the present there has been a constant succession of new and improved varieties—selected largely from offsprings of the original "big six" (see page 580)—that has brought these ferns into American homes literally by the million.

More than 200 distinct forms have been propagated, and of this number about 100 are recognized as named varieties. All, so far as definitely known, have arisen as "bud sports"—that is, from buds developing upon the numerous "runners" given off by mature plants.

The newest and most remarkable form of all (var. *trevilliani*) is a little plant whose fronds appear like tiny balls an inch or two thick, consisting of a mass of irregularly forking green strands of varying length and breadth. In this one

Photograph by R. J. Baker

A HAWAIIAN FERN FOREST

These are the ferns (*Cibotium*) that formerly furnished the soft stuffing material known as "pulu." Because of its high absorbent quality, "pulu" was used to stanch blood flow, also.

Photograph by Charles Martin

A BIRD'S-NEST FERN, NORTHERN LUZON, PHILIPPINE ISLANDS

direction it seems as if the Boston Fern could vary no further.

Scientifically, no less than horticulturally, the Boston Fern is of extreme importance, serving as the basis of experimental studies in evolution, the causes underlying the appearance of new forms, their significance, and the possible control of their production. All in all, a remarkable performance for a single tropical fern.

THE ECONOMIC USES OF FERNS

In spite of the commercial importance of the Boston Fern and its numerous forms—a trade which places nearly two millions of living ferns annually in American homes, and represents a large outlay of capital—one hears sometimes the statement that ferns are of no economic value, by which is meant probably that they serve few important uses in the arts and industries. This is only partially true.

In olden times many ferns were thought to possess curative properties, and, in the form of syrups and decoctions, were prescribed for pulmonary affections and various internal disorders.

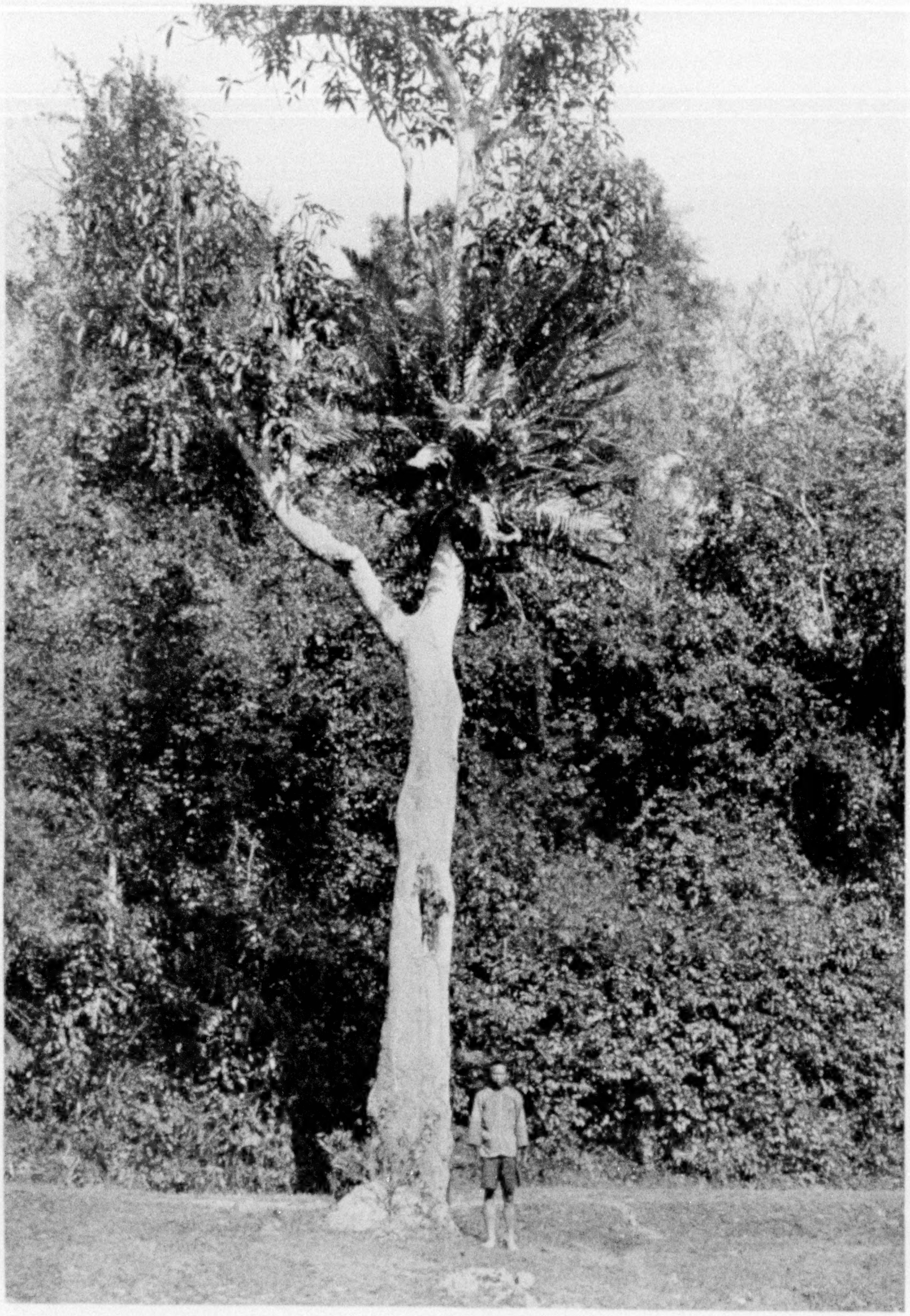
Various Polypodies were used in medicine also by the aborigines of tropical America, and one (*Polypodium glaucophyllum*) has abundant vinelike rootstocks which the natives of northern South America still use for sweetening.

The rootstocks of a Polypody of the western United States (*P. glycyrrhiza*) also are intensely sweet and give the plant its name, Licorice Fern; it is a great favorite with children.

The huge stems of a Hawaiian Tree Fern (*Cibotium chamissoi*) formerly provided the native Hawaiians with food in time of need, the starchy core when baked being regarded as a fair substitute for taro and the sweet potato.

In tropical America the tall columnar trunks of several kinds of Tree Fern are occasionally used as telegraph poles and rather commonly as building timbers and upright supports. Their strength comes partly from the hard outer shell, partly from the intricate network of dark bony strands within. They bring a high price and are exceedingly durable, far outlasting the rude houses of which they form a part, and being used over and over again.

Not only are they resistant to decay, but to the attacks of termites as well.



Photograph by Joseph F. Rock

A HUGE EPIPHYTIC FERN OF BURMA

The tufted fronds, apparently those of a species of *Polypodium*, are as large as the man. Many tropical ferns, perched high on the trunks of forest trees, have this "bird's-nest" habit of growth (see also page 573).

The interior network especially is of almost glassy hardness, and is often used as inlay material by cabinet makers in South America.

In Java the long inner strands of a Vine-fern (*Dicranopteris linearis*) are woven into cigar cases and lightweight hats, and in Siam small, closely woven, covered boxes of oval form and exquisite design and workmanship are made from the strands of a native Climbing Fern (*Lygodium salicifolium*, page 584).

Among our northeastern ferns three species of special importance are to be mentioned — the Christmas Fern, the Common Wood-fern, and the Cinnamon Fern. The first two are exploited for their fronds, known to florists as "Dagger Fern (Plate XI) and "Fancy Fern" (Plate VIII), which are gathered in enormous quantities in autumn, packed in bales, and put away in cold storage for later use. These are the kinds usually supplied by florists with purchases of cut flowers (see page 583).

Fortunately, both are very common, and since the fronds must be picked carefully and late in the season, after the plants have matured and have shed most of their spores, it appears that neither is in present danger of extinction. Though very unlike, they are to be rated among our finest northern ferns.

The Cinnamon Fern is useful in quite a different way. Its great root-tussocks, rising well out of the moist areas where it grows, supply thick masses of wiry interwoven rootlets, which are regarded by those who cultivate tropical orchids as an ideal medium on which to grow the kinds that occur naturally on tree trunks.

This material resists decay, and its open texture permits the free drainage that is so essential. It is used also for growing tropical ferns—the epiphytic kinds.

Thus far, fern study in the United States has centered in our native species. The American Fern Society, which came into existence 32 years ago as the Linnaean Fern Chapter of the Agassiz Association, has now a membership of several hundred, mostly amateurs, who have published a great amount of information upon the ferns north of the Rio Grande.

By correspondence and exchange of specimens and through the medium of two journals devoted to ferns, this society has had a wide influence in arousing interest in the subject and in fostering close observation in every phase of fern study. At the time the society began its work, there was little promise of the

Photograph by Joseph F. Rock

A TENUOUS JAVA TREE FERN

The whitish under sides of this plant's leaves are responsible for its name, *Alsophila glauca*. This specimen is 50 feet high, with a trunk only a few inches thick. A related species (*A. excelsa*), on Norfolk Island, east of Australia, is said to reach a height of 60 to 80 feet.

Photograph from E. O. Wooton

THIS DESERT FERN POSES FOR THE CAMERA AND THEN ROLLS UP

The Star Cloak-fern (*Notholaena standleyi*) is one of the most characteristic ferns of the arid Southwest and one of the most beautiful in damp weather (see also opposite page).

many popular volumes that now deal with ferns in an authoritative and entertaining way.

The studies thus well begun should now be extended to the field of tropical America. Here in the cool, wet, mountain forests there is a wealth of ferns beyond imagination.

HOW FERNS REPRODUCE

[Plate I]

To understand how ferns reproduce, it is first necessary to know something of their structure. They exist in two separate and distinct phases the nonsexual and sexual.

The conspicuous plant that we ordinarily call "fern" represents the nonsexual stage. It is known technically as the fern *sporophyte*, from the fact that it bears spore-cases (*sporangia*) on some of its leaves, either on special altered pinnæ (as in the Cinnamon Fern) or, more commonly, in clusters (*sori*) on the under side of ordinary leafy pinnæ.

The sori are often partially protected by a delicate scalelike covering called the *indusium*. Within the spore-cases are borne a multitude of spores—very minute, roughened reproductive bodies of oval outline—which at maturity are forcibly scattered by the plant.

In present-day ferns spores take the place of seeds. The perpetuation of the fern thus depends mainly upon the germination of the spores after dispersal, and the successful development of the curious little sexual plants (*prothallia*) to which they give rise.

Before discussing the prothallia and the indispensable rôle they play in the life cycle of the fern, the remarkable mechanism by which the spores are scattered must first be described.

The form of the spore-case differs widely among the several families of ferns. In the "true ferns," or Polypody Family (Polypodiaceae), it is substantially as shown in figures 1, 2, and 3, in which the body of the spore-case is seen to be lens-shaped, with thin, transparent, fragile side walls, and a vertical jointed ring of thick cells (the *annulus*), which does not extend quite to the base on one side, being replaced there by thin, weak cells.

When the spores are mature, the ring dries and contracts, setting up a strain that ruptures the weak cells at the opposite base and at once

tears open the thin, bulging sides of the spore-crowded sporangium.

The ring, now released at one end, straightens out and bends far backward, carrying at its free end most of the spores within the ruptured body of the spore-case (figure 2). Then, with a jerk, it snaps back nearly to its original position (figure 3), catapulting the spores forward in a shower.

The bombardment of spores may readily be seen under a hand lens. The mechanical device by which they are delivered from the sporangium is superbly efficient.

Each of these minute spores is a germ, a living cell, and is capable of giving rise to a little sexual plant, which in turn will produce the plant that we call a fern.

Of the thousands, or even many millions, of spores borne by a single fern frond, only the merest fraction ever yield plants that come to maturity. Most of them are "wasted." Their release from the sporangium and their dispersal far and wide by the wind are effected under conditions of dryness, but the completion of the life cycle depends directly upon the presence of moisture.

The stages in the birth of the new fern plant are as follows:

The tiny spore, coming to rest upon a moist bank, swells, and after a few days bursts its thin brown coat. The content of the spore protrudes as a delicate green tube, the earliest stage of the plant.

By repeated cell division it quickly passes through the simpler club-shaped stages of growth (figures 4 and 5), and at length assumes a flattish heart-shaped form (figure 6).

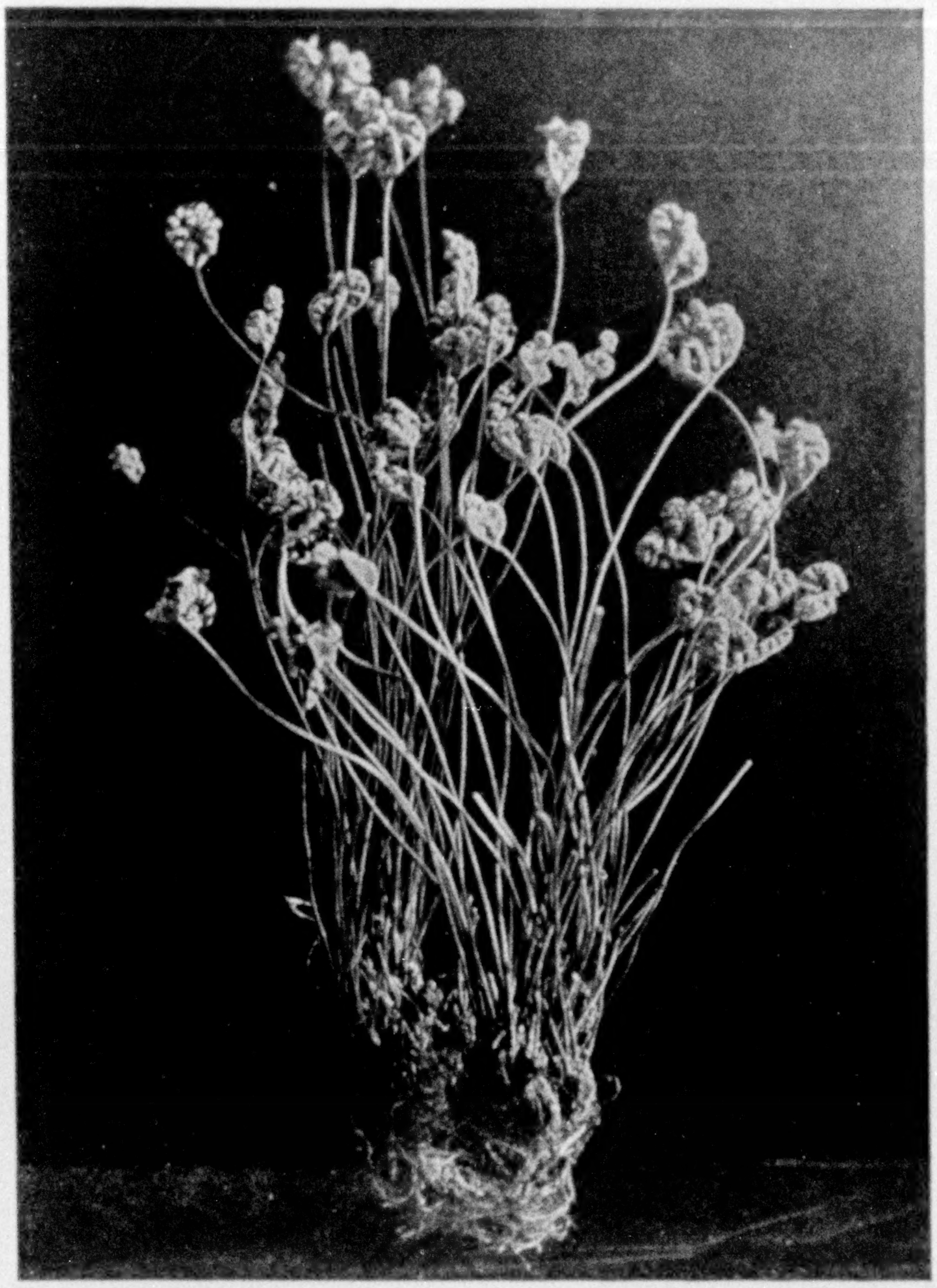
It is now a thin, green scale, not more than one-third of an inch broad, attached closely to the moist earth by numerous rootlike hairs, called *rhizoids*, by means of which it derives nourishment from the soil. In other words, it is a small self-sustaining plant, ready to bear the sex organs.

These are of two sorts, both normally borne on the under side of the prothallium: the female organs (*archegonia*), arising from a central "cushion," and the male organs (*antheridia*), which are more numerous and considerably smaller, borne nearer the edge.

At maturity the antheridia burst, releasing numerous microscopic male bodies called *spermatozoids* (figure 7), which, by means of motile cilia attached at one end of the spirally coiled body, swim actively in the film of water that has been necessary for their release and is equally necessary for the act of fertilization.

A single spermatozoid enters a ruptured archegonium and there unites with an egg cell (*ovum*). Their fusion constitutes fertilization. The resulting cell is known as the *zygote*.

The zygote gives rise directly to the new fern plant. As it grows, there appears from its upper part, by cell division, a tiny first leaf, and from its lower part the first root and a curious organ called the *foot*, by which the new plant receives nourishment from the prothallium until

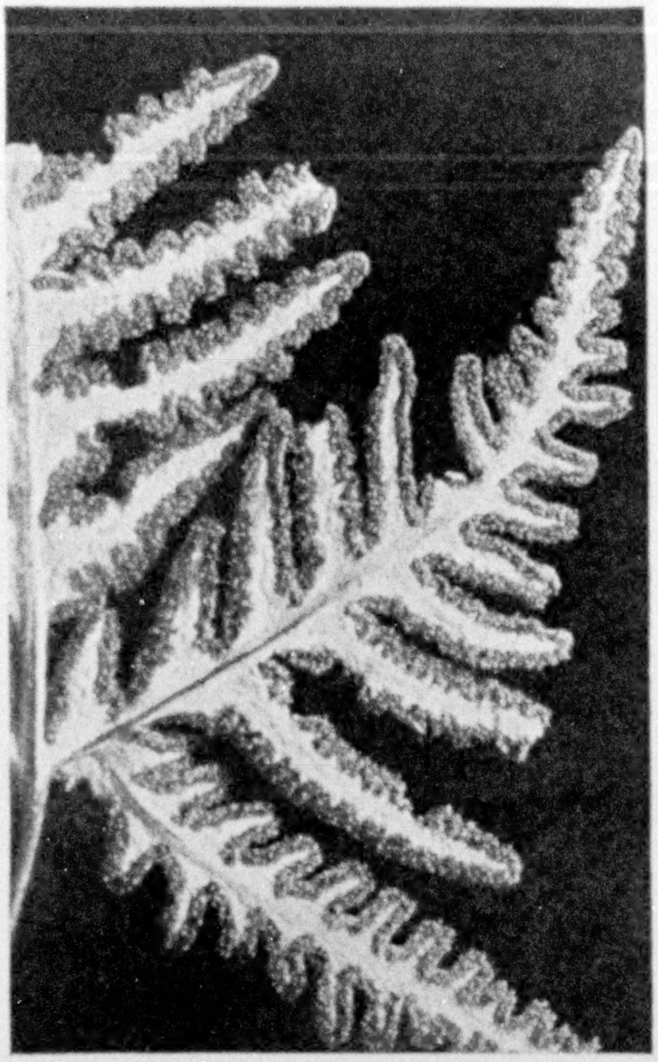


Photograph from E. O. Wooton

THE STAR CLOAK-FERN (SEE ALSO OPPOSITE PAGE)

In the prevailing dry weather of the desert the blades of this fern (*Notholaena standleyi*) roll inward upon themselves, contracting into tight yellow balls. When the rains come they spread out and resume their graceful posture.

XUM



Photograph by E. O. Wooton

A DETAIL OF THE STAR CLOAK-FERN

(*Notholaena standleyi*)

The under side of the drought-resistant blade is thickly coated with yellow waxlike powder, which serves to cut down surface evaporation. Incidentally, it makes a lovely color contrast with the dense rows of dark-brown sporangia that border the segments.

it is able to support itself. (A prothallium and young fern plant attached are shown in figure 8.)

Under favorable conditions the young plant grows rapidly, the very simple first leaf being followed by others that are larger in succession and more like those of the adult plant.

In the meantime the prothallium, or *gametophyte* (so called from its bearing the sexual bodies or *gametes*), has withered and passed away, having served its purpose.

The above brief account of the life history of a fern describes the normal and usual cycle, which is known as the "alternation of generations."

Sometimes, however, certain of the structures are greatly modified in form and function, with corresponding omission of one or more of the events mentioned.

Perhaps the most common sort of vegetative increase among ferns is that in which the fern strikes root at the tip of its frond; the Walking-fern (Plate XIV) is a good example. This form of propagation is especially common among tropical ferns of many groups and is sometimes accompanied by a lessening of spore production.

RATTLESNAKE FERN

Botrychium virginianum (L.) Swartz. Adder's-tongue Family [Plate II]

Without its "fruiting" stalk, the Rattlesnake Fern might readily be mistaken for a sterile flowering plant by the amateur botanist. It is one of the so-called Grape-ferns (*Botrychium*), which, with the Adder's-tongues (*Ophioglossum*), belongs to a family quite dissimilar from the "true ferns."

The sporangia are globose and separate and are always borne on the terminal branches of a special stalk. They have no "ring," but open by a deep slit, which allows free egress of the spores from the purselike structure.

In one form or another, the Rattlesnake Fern is common over a large part of North America. It grows best in the deep woods soil of shady ravines and forest slopes, but often produces dwarfed fertile fronds under less favorable conditions. The spores are shed in June, after which the fertile stalk promptly withers.

"Sang sign" is the name given to the plant in parts of Kentucky, from the fanciful belief that the tip of the sterile blade points to a ginseng plant. For the same reason it is sometimes called "Indicator" in Virginia.

ADDER'S-TONGUE

Ophioglossum vulgatum L. Adder's-tongue Family [Plate III, right]

The Adder's-tongue resembles the true ferns even less than do the Grape-ferns. It differs from the latter in having the sterile blade undivided and net-veined, and the sporangia closely joined in a compact two-rowed spike.

In all members of the Adder's-tongue Family, the fronds are succulent and spring from a short rootstock with fleshy roots. Root-hairs are wanting, their place being taken by minute fungous threads (*mycorhizas*) that envelop the roots and provide the necessary nutriment.

The Adder's-tongue grows in a great variety of situations, though perhaps best in low meadows, and is widely distributed in North America and Europe. It is often overlooked by collectors, because inconspicuous among the plants with which it grows; but, like the four-leafed clover, it is likely to be found more frequently, once the knack of "picking it out" has been acquired.

CLIMBING FERN

Lygodium palmatum (Bernh.) Swartz. Climbing Fern Family [Plate III, left]

Curious and diverse are the members of the Climbing Fern Family. In general appearance the species shown in the color plate is very unlike its cousin, the Curly-grass (see illustration, page 567).

The Climbing Fern does not belie its name. It is a true climber, twining two or three feet

high on saplings in low sphagnous woods, along shady watercourses, or at the edge of cat-brier tangles from New England to Florida.

Except for the greatly contracted fertile tips, the fronds are evergreen. During the Christmas season plants are sometimes brought in to the Washington, D. C., markets and offered for sale under the name "Alice's Fern." "Hartford Fern" and "Windsor Fern" are names applied in New England.

This plant is famous as being the fern whose destruction was prohibited by law in Connecticut in 1867—said to be the first bill passed anywhere in the United States for the protection of a wild plant. Nevertherless, the fern is slowly disappearing, as clearing of agricultural land proceeds.

On the other hand, a Japanese Climbing Fern (*L. japonicum*) has escaped from cultivation in the South and is already well established in three States.

Photograph from John K. Small

THE SHOESTRING FERN (*Vittaria lineata*)

This, one of the numerous tropical ferns that reach the hummocks of tropical Florida, is here growing on the rough trunk of the Cabbage Palmetto (*Sabal palmetto*). The tufted fronds are thick and leathery and only an eighth of an inch wide, resembling nothing so much as dark-green shoestrings.

ROYAL FERN

Osmunda regalis L. Flowering Fern Family [Plate IV]

The Royal Fern, which is found on all the continents, is indeed well named. In the United States it grows to be six feet high, in England to ten feet; but under all circumstances it is a plant to catch and hold the eye, its mass of reddish-green uncoiling fronds a thing of beauty in spring, its full-grown crown of arching, locust-like foliage a picture of stately grace in summer.

The large glocose spore-cases are borne thickly in a panicle at the top of the frond, on small skeleton-like pinnæ. The spores, which are shed in profusion, are dark emerald green and short-lived. Late spring is the usual fruiting season, but occasionally spores are borne in autumn, also.

INTERRUPTED FERN

Osmunda claytoniana L. Flowering Fern Family [Plate V]

The Interrupted Fern, known also as Clayton's Fern, is common to the eastern United States and eastern Asia, and, without exception, is the finest of our native species for outdoor cultivation—a fact not generally appreciated. It is highly individual in form and bearing and is superbly graceful.

The fronds are of two sorts, an outer circle of arching sterile fronds, and an inner cluster of taller fertile ones that stand stiffly erect, curving outward just above the fertile pinnæ that are borne near the middle of the frond.

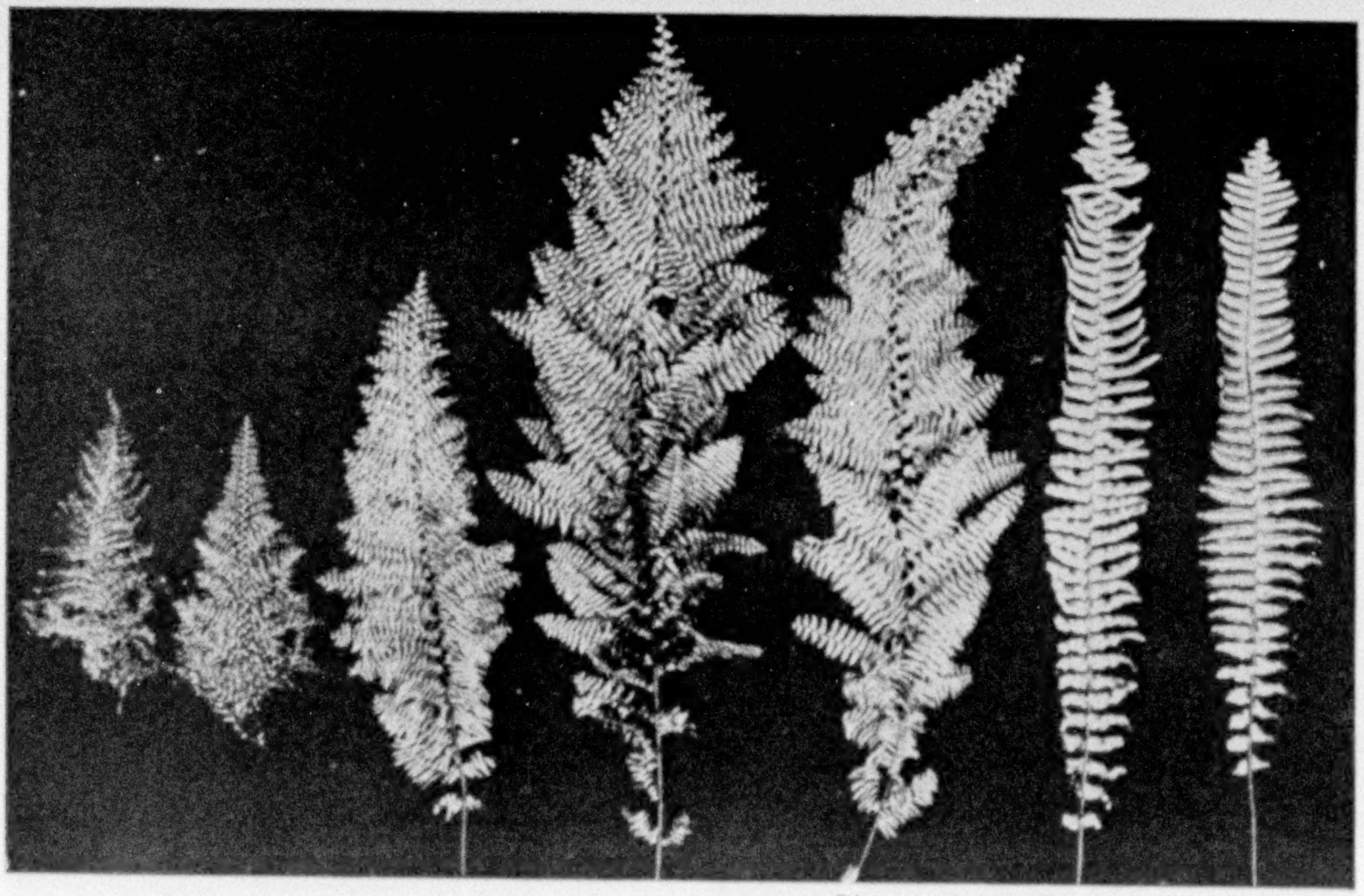
The velvety, bronze fertile pinnæ discharge their mass of green spores early in the season, but persist in a brittle dark-brown condition through the summer. The usual height of the fertile fronds is three or four feet, though occasionally exceeding five feet.

Sometimes the Interrupted Fern grows in really wet situations, along with the Cinnamon Fern, but more often it is found on rocky banks.

Photograph from John K. Small

THE SWORD FERN OF TROPICAL AMERICA, FROM WHICH THE BOSTON FERN SPRANG

The Sword Fern (*Nephrolepis exaltata*) grows naturally in dense jungles at the edge of the Everglades in Florida. Under wild conditions it gives no hint of its vagaries (see page 567).



Photograph from Brooklyn Botanic Garden

THE SWORD FERN AND SIX OF THE VARIETIES TO WHICH IT HAS GIVEN RISE

At the right, a normal frond of the Sword Fern (*Nephrolepis exaltata*), from Florida, which bears spores. Next to it is a frond of the Boston Fern (*N. exaltata* var. *bostoniensis*), which is sterile. Five lacy varieties (all sterile), derived from the latter as "bud sports," are shown in the order of leaf dissection: var. *piersoni*, once to twice pinnate; var. *barrowsi*, twice pinnate; var. *whitmani*, thrice pinnate; var. *smithi*, four times pinnate; var. *craigi*, five times pinnate.

Photograph from John K. Small

VENUS'-HAIR, CURTAINING A BLUFF OF THE APALACHICOLA RIVER, FLORIDA

Here, as elsewhere throughout its wide range, the Venus'-hair or Southern Maidenhair (*Adiantum capillus-veneris*) often covers perpendicular rocks to the exclusion of all other ferns and of flowering plants. The graceful drooping fronds, spread to catch all the light, form a wonderful mosaic.

in thin shade or in the rich soil of hilly woods. It is readily transplanted and will thrive if placed in a fairly moist, open situation, where it may develop symmetrically.

MAIDENHAIR

Adiantum pedatum L. Polypody Family [Plate VI]

The genus *Adiantum* has about 200 species, nearly all delicate, graceful ferns with dark polished stalks and finely divided blades. Of these none is more beautiful than our own Maidenhair, which occurs rather commonly over most of North America north of Mexico. It grows best in the rich soil of slight hollows in moist hilly woods, sometimes reaching a height of two feet.

Clumps set out about the house may multiply vigorously, but unless given deep peaty soil and the protection of ample shade, they will rarely match the beauty of the plant in its dim wild home.

The young, uncoiling fronds are of a deep magenta—"about the color of new-born mice," as a recent writer expresses it—but the stalks rather quickly assume a polished purple-brown appearance.

The name "maidenhair" itself doubtless reflects the fancied resemblance of the fine lustrous stalks of the Southern Maidenhair (see above) to women's tresses, and the custom that long prevailed in southern Europe of washing the hair in a decoction of this fern, which is called also Venus'-hair.

BRACKEN

Pteridium latiusculum (Desv.) Hieron. Polypody Family [Plate VII]

The Bracken, usually known as *Pteridium aquilinum* (L.) Kuhn, is one of the most cosmopolitan of ferns, extending in one form or another over most of the world.

In the Northeastern States it is often known as Hog-brake, because its wide-creeping, starchy rootstocks are eagerly grubbed out by swine as food. The farmer sometimes takes advantage of this by fencing hogs within an area supporting a luxuriant growth of the fern. The hogs, by rooting out the deep-seated rootstocks, not only render the hitherto worthless land fit for cultivation, but support themselves into the bargain.

The Bracken—using the name in its wider sense—finds many uses. The fronds serve as thatch, stable bedding for animals, packing material, and, when young, for food, either cooked or in a raw condition. From the inner parts of the rootstock starch has been manufactured, and the roasted rootstock also is eaten; the outer parts are used by Indians in basket-making.

BOSTON FERNS IN A WASHINGTON, D. C., GREENHOUSE

Photographs by Clifton Adams

ONE OF THE "ECONOMIC USES" OF FERNS

As a setting for cut flowers in bouquets, fern leaves have no rival. Those here used with roses are Fancy Fern, or Common Wood-fern, Plate VIII (*Dryopteris intermedia*), and Maidenhair, the former just taken from boxes held for months in cold storage.

Photograph by Clifton Adams

A BOX OF CUT FERNS

These fronds are picked in summer, packed in boxes with a lining of moss, and then placed in cold storage for winter use. When taken from the refrigerator, months later, the ferns are still as fresh as when cut and are ready for the florist retail trade (see text, page 575).

As might be expected of a fern at once so common, widespread, and conspicuous, the Bracken has figured extensively in folklore and mythology, and literature is replete with references to it.

COMMON WOOD-FERN

Dryopteris intermedia (Muell.) Gray. Polypody Family [Plate VIII]

The present species, mentioned elsewhere as the "Fancy Fern" of florists, was long regarded as a variety of the Spinulose Wood-fern (*Dryopteris spinulosa*). It is known only from eastern North America and is one of our handsomest and most distinctive ferns, occurring over a wide area, usually on moist wooded slopes or on the drier knolls of low woods.

In distinction from the Spinulose Wood-fern, the fronds are evergreen, and the more deeply cut, crowded pinnæ are set nearly at right angles, with the spinulose teeth more distinct and "open." The indusium is slightly toothed and bears numerous minute glands also, whereas these are lacking in the indusia of *D. spinulosa.*

MARSH FERN

Dryopteris thelypteris (L.) Gray. Polypody Family [Plate IX]

The most favorable places in which to look for the Marsh Fern are low, marshy wood-edges, open swale land, and wet, sunny meadows. Here, always with its feet in or near the water, it is likely to be found in profusion, the tall, long-stalked fertile fronds rigidly erect and half hidden among sedges, rank grasses, lobelias, and various composites.

In early fall the spores, released in myriads from the heaped-up sporangia beneath the rolled-over edges of the leaf lobes, suffuse the under surface of the blade and are shed in enormous volume, quite justifying the name "Snuffbox Fern."

The Marsh Fern fruits well only in strong sunlight. It is common throughout most of eastern North America and occurs also in Europe and Asia and in Bermuda.

MARGINAL FERN

Dryopteris marginalis (L.) Gray. Polypody Family [Plate X]

If, wandering in rich rocky woods, or, at risk of a wrenched ankle, clambering over rough rock-slopes at the base of shady cliffs, you come upon a perfect crown of blue-green fronds rising two or three feet on shaggy stalks from a stout, erect rootstock equally shaggy with conspicuous bright-brown scales, you may know it for the Marginal Fern. It loves loose rocks. The fronds are almost leathery in texture, and of all our large woodland species they alone have a blue-green color.

Photograph from U. S. National Museum

A BASKET WOVEN FROM A SIAMESE CLIMBING FERN

The slight, twining stems of this species (*Lygodium salicifolium*), climbing 10 feet high, are cut and dried in the sun, after which their outer part is split into long, fine strips. No dyes are used. The work of weaving a single small basket-like covered box such as this (illustration one-half natural size) requires three or four weeks. The art is dying out, being practiced mostly by prisoners nowadays.

Next to Goldie's Fern (*Dryopteris goldiana*), the Marginal Fern is the most stately and attractive of the common woodland ferns of eastern North America. It transplants easily and under suitable conditions responds well under cultivation.

The thick fronds are thoroughly evergreen and, spreading outward, lie prostrate, like a green star, throughout the winter. The name alludes to the position of the sori, which are set close to the margins of the pinnules.

CHRISTMAS FERN

Polystichum acrostichoides (Michx.) Schott. Polypody Family [Plate XI]

Excepting only the Common Wood-fern, the Christmas Fern is probably the best known of our eastern species. Its fronds are much sold by florists, under the name "Dagger Fern." Fortunately, it is abundant, growing usually in large colonies along the cool, shady banks of moist gullies and along steep, wooded roadsides, where in all seasons its glossy, rich green fronds are a familiar sight to passers-by.

The uncoiling leaves of early spring are silvery green, from a superabundance of whitish scales that have protected the plant in winter. When full grown they are thick and thoroughly evergreen, well suited to the important part they play in Christmas decoration.

The Christmas Fern has fronds of two sorts. The numerous sterile ones arch outward in a circle; the fertile ones—that is, those with contracted fertile tips — stand rigidly erect within, often to a height of three feet. Early in summer the circular parasol-like indusia are pushed aside and hidden by the ripening sporangia, which spread over the under side of the fertile pinnæ and thickly cover it with their brown remains.

Although hardy, the Christmas Fern is none too tolerant of change in surroundings. To do best in cultivation, it should have deep soil in ample shade, and should be well watered. With proper care, this is one of our most handsome ferns.

SENSITIVE FERN

Onoclea sensibilis L. Polypody Family [Plate XII]

The Sensitive Fern is found in Europe, northern Asia, and eastern North America, and is known doubtfully in a fossil condition. It is a coarse, weedy-looking plant, as it grows in low thickets or in moist, open situations generally; but, as a counterfoil to the more delicate kinds, it is of distinct value in plantings of ferns, and, in its vivid yellowish-green coloring and sturdy growth, reveals an unsuspected charm of its own. Moreover, it is almost unique among our native ferns in its curious fertile fronds.

These develop in late summer and present the greatest contrast to the leafy, sterile ones. The divisions are hard, of plump, berry-like form, and consist of tightly rolled lobes within which is borne a mass of sporangia. At maturity they burst open, to release the spores; but they retain their distended form, and the erect weather-beaten stalks surmounted by berry-like clusters stand upright to the following year.

Through injury to the plant in the early growing season, numerous half-fertile fronds of curious shapes and sizes are sometimes produced later in the year. These have led to much discussion and are interesting objects of study, as showing the effort of the plant to transform into vegetative leaves, as they develop, buds that originally were destined to be fertile fronds of utterly different structure.

Photograph from E. O. Wooton

A DAINTY LITTLE FERN OF THE ARID SOUTHWEST

The plant is *Bommeria hispida*, nestling under a big granite bowlder in the Organ Mountains of New Mexico, all unconscious of its shortcoming in having no "common name."

EASTERN LADY FERN

Athyrium angustum (Willd.) Presl. Polypody Family [Plate XIII]

Recent studies have shown that the Lady Ferns, long classed under a single name, *Athyrium filix-femina*, actually belong to several different species. The true Lady Fern (*A. filix-femina*) occurs in Europe, Asia, and western North America. The common plant of the Northeatern States is *Athyrium angustum*.

The Eastern Lady Fern is a common species and an extremely variable one, growing in all sorts of situations, from low, moist woodlands and shaded stream banks to dry woods and bushy clearings. Individual fronds are often of great beauty and delicacy; but, except in moist, protected situations, it is not an attractive fern, being especially liable to disfigurement.

WALKING-FERN

Camptosorus rhizophyllus (L.) Link. Polypody Family [Plate XIV]

The trick of striking root at the end of the frond and there producing a new plant is the most interesting trait of the Walking-fern, itself a plant of extraordinary appearance.

The fronds, bluish-green and glossy, are tardy in uncoiling their long, slender tips, so that not until late summer do rootlets and the first tiny leaves develop from the brownish thickened ends, pushed down against the mossy bank or bowlder upon which the plant grows. By winter a rosette of several little leaves has been formed.

But the Walking-fern is evergreen, and the new plant remains attached to the parent frond until the following season, and even then may not be separated. Occasionally as many as three or four plants are seen thus attached in a row.

The Walking-fern ranges from Quebec to Minnesota and the southern Appalachians, and, though not a "common" species, is often locally abundant. It is almost confined to shady bowlders and damp, mossy ledges, but is occasionally found on rotten stumps and on peaty banks capping the cliffs.

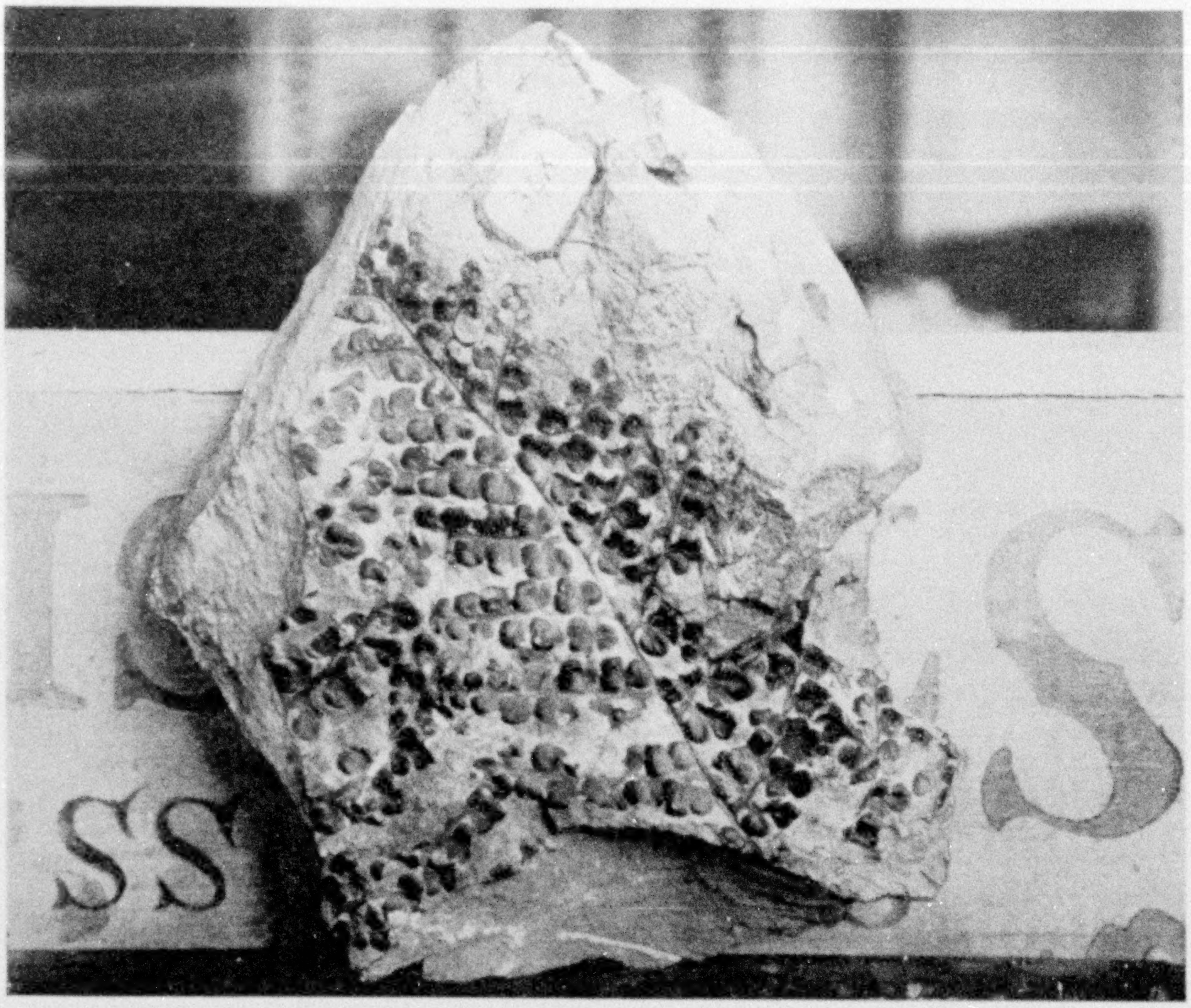
Usually the plants grow in dense mats, the odd, leathery fronds—up to 12 inches long—interlacing in all directions. There are few things that bring a keener thrill to the fern student than his first sight of a colony of this remarkable plant.

DWARF SPLEENWORT

Asplenium trichomanes L. Polypody Family [Plate XV]

Growing usually with the Walking-fern, but tucked away in the chinks of shaded cliffs, will be found the Dwarf, or Maidenhair, Spleenwort. It is our daintiest fern. The fronds, mostly four to six inches long, are arranged in a spreading rosette, all facing the source of light.

The attractiveness of the plant comes equally from its surroundings, its delicacy, and the beautiful color contrast afforded by its dark clear-green pinnæ and shining, purplish-brown, threadlike stalks.



Photograph courtesy U. S. Geological Survey

A FOSSIL SEED-FERN FROM THE WEST VIRGINIA COAL FIELDS

The plant illustrated is *Sphenopteris obtusiloba*, one of the Pteridosperms, or so-called Seed-ferns, that were abundant in the upper Carboniferous Coal Measures. Its age is not less than 100 million, and may exceed 300 million, years. Recent studies have shown that these plants, long regarded as true ferns, had developed the seed-bearing habit even at that remote period. They are known also as Cycadofilices from the fact that they combine the foliage and certain anatomical details of ferns with other structures suggesting the Cycads, a small group of flowering plants now almost restricted to the Tropics.

The Dwarf Spleenwort ranges from Alaska and eastern Canada to the Mexican border and occurs on all the continents except South America.

BULBLET BLADDER FERN

Cystopteris bulbifera (L.) Bernh. Polypody Family [Plate XVI]

More than any other of our eastern species, perhaps, the Bulblet Bladder Fern has to be seen in its native haunts to be appreciated. For sheer grace and airiness, there is nothing quite equal to a curtain of its delicate fronds, overhanging a shady limestone ledge in the spray of waterfalls or half screening a woodland brook.

The fresh, green fronds, long-tapering and sinuous, appear alert and poised. The fertile ones are longest—often three and sometimes four feet long—and bear the bulblets, besides. The sterile ones, and those growing in drier or more open situations, are shorter and narrowly triangular, as shown in the illustration. A young plant growing from a bulblet is shown in Plate I (figure 9).

The Bulblet Bladder Fern is found only in North America, extending from Newfoundland to the southern Appalachians and westward.

Notice of change of address of your GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your July number, the Society should be notified of your new address not later than June first.*

TRACKING THE COLUMBIAN GROUND-SQUIRREL TO ITS BURROW

Loss of Millions to Crops and Danger of the Spread of Spotted Fever Necessitated Study of Peculiar Rodent of Western North America

By William T. Shaw

Assistant Zoölogist, Washington State Experiment Station

With Illustrations from Photographs by the Author

EXTENDING widely over western North America, from California north into Alaska, thence far into Siberia, is a genus of ground-squirrel known as *Citellus*. To it belong numbers of species, many of which are represented by such multitudes of destructive individuals as to make their presence in a territory a matter of economic concern.

An annual loss of upward of $10,000,000 to the crops of the United States, the possibility of its transmitting the spotted fever in Montana and the bubonic plague in California and other southern and western States are considerations which have moved the Government to take serious steps toward its extermination.

The squirrels belonging to this group are more or less truly ground-squirrels, living in elaborate burrows or dens. They inhabit the prairies, the sage and bunch-grass plains, wherever there is sufficient vegetation to support them. The Columbian ground-squirrel (*Citellus columbianus*) is the species found on the higher grass plateaus of eastern Washington and parts of Oregon and Idaho. It is to this species that close study has been given.

FACING THIRST, THE SQUIRREL GOES TO SLEEP

Timid mammals, living upon the surface of the earth or among the branches or trunks of trees, present difficult problems of study. When, however, the greater part of their life is spent in tortuous tunnels or, as some one has expressed it, in "The underground City of Citellus," the problem becomes even more difficult.

The Columbian ground-squirrel is an active, nervous, sun-loving, gray-brown animal about the size of the eastern gray squirrel; differing from it, however, in that its body is less lithe, its tail much less bushy, and its ears noticeably short. In slovenly cultivated wheat areas it soon becomes startlingly abundant; for, where not checked, it thrives with the raising of grains and alfalfa.

The ground-squirrel does not need water; it prefers succulent vegetation for the necessary moisture. This fact is responsible for the great damage done by it to growing grain; for, in attempting to obtain the desired amount of food and moisture from the tender stems of the developing wheat, it soon converts a waving field into a wilted, broken stubble.

BEGINS A SIX-MONTHS' SLEEP IN SUMMER

In mid-July a drought comes over the land of its habitat, and the squirrel can no longer find a trace of green vegetation. It would choke from sheer thirst, but instead it goes to sleep!

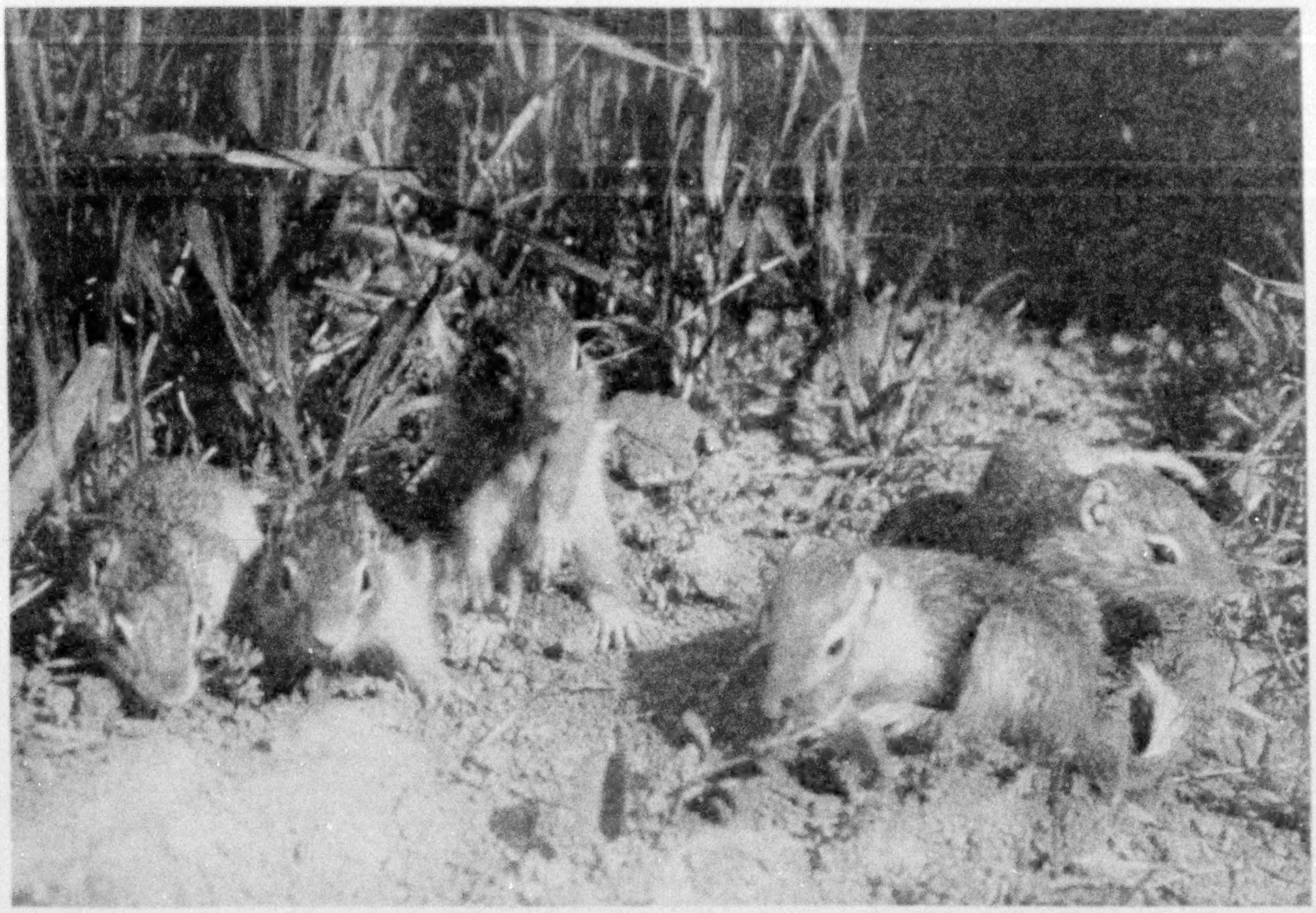
This interesting adaptation might fittingly be called hibernation were it not that it is begun in midsummer. About the first of July the numerous family of May and June gradually disappears until, in the steady heat of the early August days, not a squirrel is left; nor are they seen again until the snows of February are melting.

During this interval they are found in a remarkable state of death-like sleep. Their normal temperature, which ranges about 98° F., falls to the remarkably low point of 40° F., and in a cold, clammy condition the animals exist for weeks at a time, exhibiting the merest traces of life, and in the latter stages of the long sleep developing a startlingly death-like

XUM

PHOTOGRAPHS OF A COLUMBIAN GROUND-SQUIRREL FAMILY TAKEN WITHIN THREE WEEKS

One of the remarkable features of this squirrel is its rapidity of growth. The picture at the top was taken on April 1, the middle picture shows the same family on April 10, and the bottom shows the brood on April 22. The animals more than doubled in weight during the last 12 days.



TWENTY-NINE DAYS OLD

This is the same family of squirrels shown on page 588. The rodents are now practically fully developed, though immature, and have come out of their nest into the daylight. They respond quickly to the call of the mother, attempt to bite if injudiciously handled, and altogether are quite grown up. On this date they ate both carrots and grass, having previously relied upon the mother for nutrition. While being photographed they gave an exhibition of stretching in the warm sun, which they dearly love.

limpness which makes one marvel that such objects could ever again regain warmth and form and life. This they do, however, sometimes in the surprisingly short space of a few hours.

To understand this strange life cycle the better, we should take it at the height of its activity. Walking over the wintry stubble of the Palouse River plains on a mid-February day, no signs of life are to be observed in any direction. Countless sleeping domes of volcanic ashen soil, now piled high with a winter's drift of snow to the steeper northern slopes, windswept and patchy to the south, lead away to a cold blue-gray line of mountains in Oregon; yet it may be only a few days before these same southern slopes are alive.

THE SQUIRREL WAKES LATE IN FEBRUARY

It was in the burning heat of an August day that the squirrels went to sleep; now, with the long night past, they awaken to the strange task of liberating themselves from the frozen crust of winter. Soon scurrying little creatures are everywhere.

The end of February is the awakening time, and time is life to the squirrel. He must be stirring. In the interval against the returning of a sun-parched August day his family must be born, reared, and allowed to develop to such a stage as will safely carry the young past the dangers of their first winter's hibernation—all this in a scant five months.

By March 10 the more mature squirrels are mating, even at a time when the immature individuals of the previous year are still in their hibernating dens. The first of April finds new-born young in the nest, but it is not until nearly a month later that, on a bright sunny morning, one may see dainty, fascinatingly fluffy little creatures, all crowded wonderingly about the same small door, venturing scarcely an inch away, and ever delicately responsive to the danger call of the mother.

A NEST OF YOUNG WILD SQUIRRELS

Much of the data concerning the life history of the Columbian ground-squirrel could not be obtained by a study of the animals in the open. A strip of original bunch-grass land alongside the campus of the Washington State Experiment Station was found to contain many old, unused dens of the squirrels. About this land trenches were sunk to a depth of six feet and walls were erected in these to a height considerably above the ground. These virtual cages measured 50 x 100 feet, and in them wild squirrels were released after being first branded and registered so that they could be easily recognized.

Here they remain for a few days only, exploring the great winding burrows of the summer dens in which they were born and playing in little squirrel-family tussles with their brothers on the sunny mounds about their doors; then a few days more of family life and the squirrel nest is shaken out. Now it is that they do such serious damage to the developing grain.

The country seems underlaid with a vast network of disconnected squirrel dens, many of them at times unused, but, in places where a firm soil exists, capable of maintaining their integrity for years. Their use or disuse depends to a large extent upon the presence of one of their mammalian enemies, the badger, or upon the war waged upon them by man.

These young squirrels, together with the adults, scatter about over the fields, seeming to know by instinct where the old dens exist, even if to us all surface indications have been effected by plow and harrow. They soon open these unused deserted places, and shortly the fields of wheat begin to show circular areas of desolation.

A SQUIRREL CAN CONSUME 500 WHEAT STEMS A DAY

With advancing season and maturing fields comes a cessation of rain. In the days of virgin bunch grass the squirrels met this adverse period with a trick they had learned of cutting in the side of the grass stem and nipping out the tender, succulent part which served them with both food and drink, for in many of these stretches of bench land surface water did not exist. It was but a step, then, to apply the same instinct of food-getting to the wheat.

This period, just before the ripening of the grain, is a time of great loss to the ultimate yield. Experiments with squirrels under fairly normal conditions show that they may consume daily about one-third of their weight at this season, and this would be equivalent to the destruction of 500 wheat stems, and consequently

AN ORPHAN

In the cages built around bunch-grass land near the Washington State Experimental Station, released squirrels were permitted to follow a life of bunch-grass liberty, yet under slight restraint, so that they disclosed, point by point, the secrets of their hitherto obscure life.

heads, per day to the squirrel, provided they fed upon nothing else. Then follows some destruction to the actual grain itself, for its fattening properties, and the damage is done. Drought returns; the squirrels must begin their long sleep.

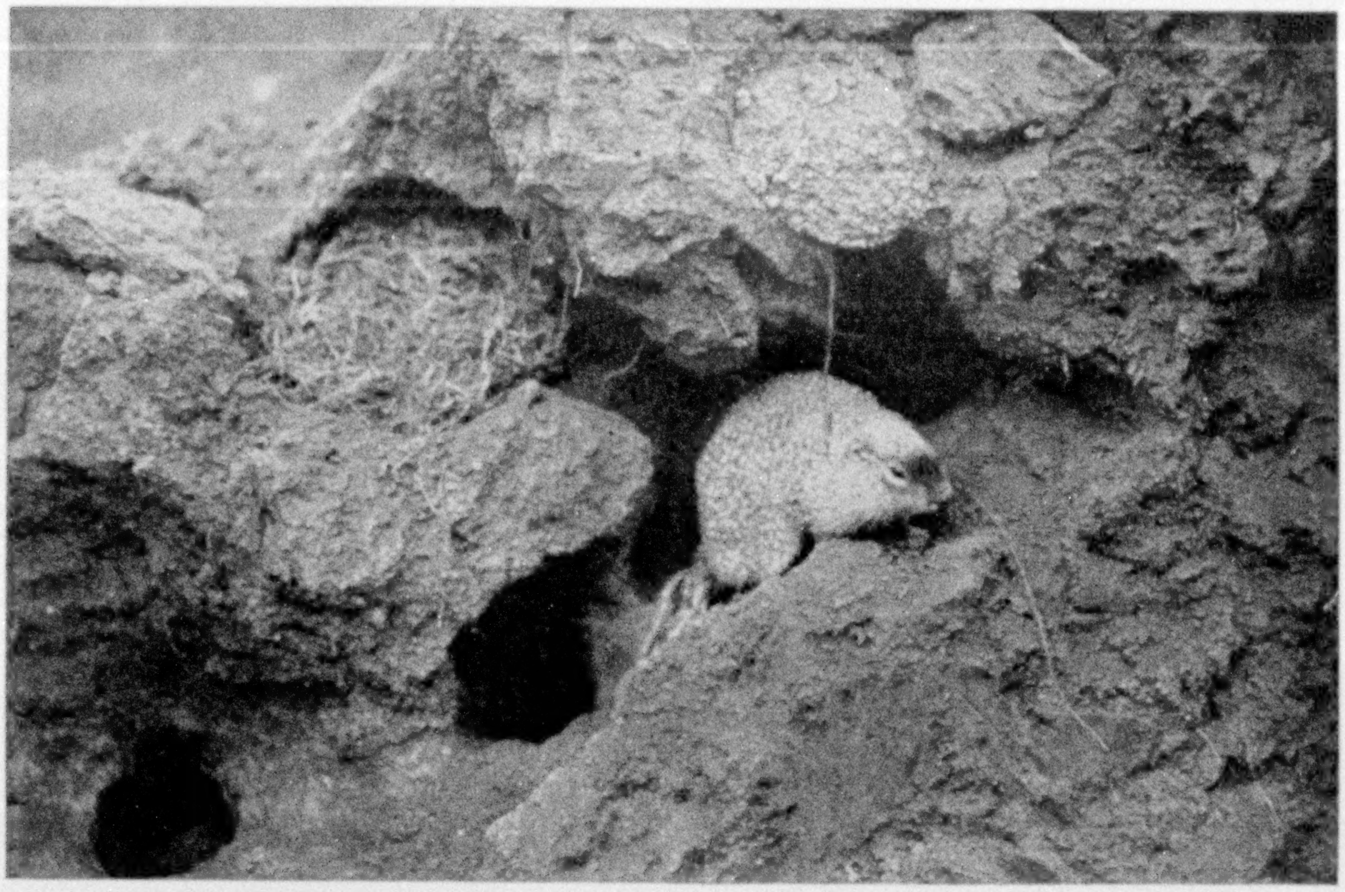
These observations apply to the country about Pullman, Washington, with an elevation of 2,500 feet above sea-level. Twelve miles to the west, in the Canyon of the Snake River, with an elevation of about 600 feet, these activities begin nearly a month earlier, and so vary with the altitude throughout the range of the species in the State.

TRYING TO UNEARTH THE FACTS ABOUT THE LONG SLEEP

Perhaps the most arduous task connected with all the life study was that concerned with the findings associated with the long sleep. Tired, thirsty, and unsuccessful was our return from each day's effort during the first fall. Where, only a few days previously, scores of squirrels swarmed the fields, now there was none; yet in the returning spring they reappeared in abundance. The following autumn we renewed the unsuccessful search and abandoned it only when November storms settled down.

True, we were working against odds, for the badger, the squirrel's natural mammalian enemy, was also abroad. Where he had dug it was too late, and where he did not work there seemed a good reason for our not trying. We were learning, however, and long before reward came in finding a wild squirrel in hibernation, we had formed a correct idea of where and how he would likely be discovered. Here and there throughout the dens we were running across certain moisture-proof, jug-shaped cells, of surprisingly uniform dimensions, which we correctly judged were hibernating cells.

So cleverly did they hide themselves that it was not until the second fall had closed without success and we were beginning the excavation of the twenty-sixth den, in the early part of the third season, that we found a squirrel in the condition of semi-estivation. This was in mid-August. They had been in estivation scarcely ten days and our find was not yet dormant—only drowsy.



VERTICAL SECTION OF A HIBERNATING SQUIRREL AND DEN

This squirrel was found November 15. He was partly awake, as were all discovered previous to this date. He is sitting just outside of the neck of the hibernating cell and just above the drain which runs down and to the left. The round circular patch of earth immediately above the squirrel is a plugged burrow filled with the lighter-colored soil.

A HIBERNATING SQUIRREL IN MID-DECEMBER

Found sitting on the flat of his back, tightly curled *vertically*, not horizontally, as is customary with a cat or dog. The top of his skull is flat in his lap. At the moment he was photographed he was beginning to revive and had raised up a little.

In this discovery we established the truth of our surmise regarding the hibernation cell. Here, at least, was a beginning. Again we persevered for more data and were partially successful in the third season, but it was not until the fourth winter that results of value were obtained.

A NATURALIST'S FIELD NOTES

On one occasion we started out to work on a bright December morning. Of that day the field-notes say:

"We had planned to begin work early, in order that we might make use of the precious winter light for photography. At 6 o'clock a light wind was blowing, but at 7 conditions looked so much better we decided to brave it.

"Shortly the wind began to increase and by noon was blowing steadily and strongly. With its increasing strength came an ever-thickening cloud of dust out of a desert country miles to the southwest.

"At noon we built a fire in the snow-free excavation we had made. In order to strike a light, we had first to cover completely with coats and crouching men the kindling pile of shavings. Here we sat about the fire, some of the party almost blinded with smoke, others singed at times by the wind-swept flames. Dust and fine sand from the diggings sifted into the skillet and coffee-cups, leaving a fine precipitate in the bottom. Soon no trace of the fire remained, other than the red fire-burned soil. Ashes there were none, all having been sucked up by the terrific blasts."

On another December day when we were successful, the field-notes have the following:

"At 2:15 p. m. Richardson, a new man on the job, was working near the surface, about the center of the den. Presently his shovel cut cleanly through the moist earth and uncovered, or rather sliced off, the top of a large open burrow. No hole appeared at the surface of the ground.

"The freshness of the burrow at once attracted attention. It was smooth-walled and fresh-looking and bore no trace, as in other unused winter burrows, of fuzzy, sprouting rootlets.

"The burrow was dropping with a steep slant. It was followed carefully in vertical section until it struck a horizontal burrow going both ways. To the left the hole was plugged concavely with what appeared to be black surface dirt, which may have come from the vertical shaft. To the right it sent a branch down into a drain-like structure; then continued straight on.

"As far as my arm could reach in this burrow, which came up slightly, I could barely touch some nest material. A little of this was drawn out and found to be made up of rather old-looking bits of broken straw. We now tried to cut through the hard clay to the nest.

"A drain shaft next revealed itself, while the burrow continuing beyond it raised slightly, as though it might be draining a hibernating cell. All of these indications were exactly as they should be—even excitingly so.

"The strained length of my fore-arm permitted my extended finger-tips to touch, rather uncertainly, a little bit of dry nest material. Yet it was old, and not new, coarse, wild grass, of which the outside of the typical hibernating nest is usually constructed. This was an unfavorable sign. Between us and the nest lay a heavy mass of hard subsoil.

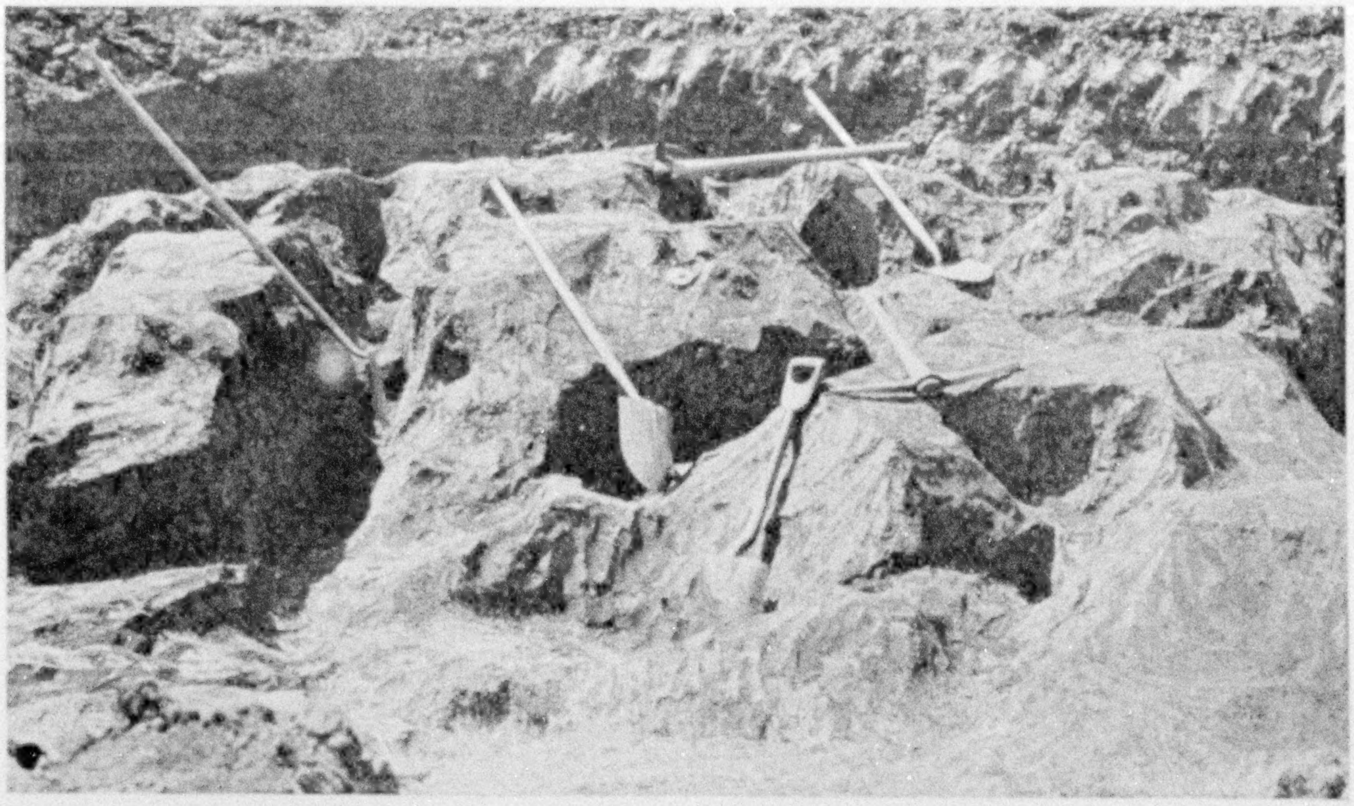
THE END OF THE QUEST

"Would this be the strike? Photographic light was fast running out of a short winter day. It was indeed a race with night. With a will the workers heaved out a space for the camera. One ran for firewood with which to warm the operator's finger against the frosty air.

Carefully the heavy clay was shaved away from the location of the cell. Suddenly its upper wall shelled in, and there, from the little round hole in the nest material, lay the fuzzy gray tail-tip of a soundly hibernating ground-squirrel.

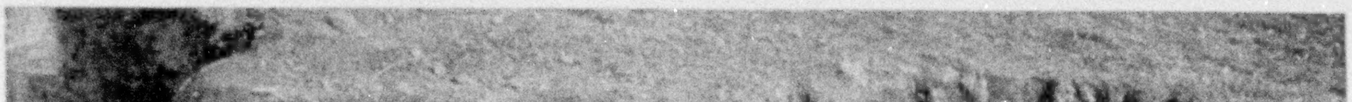
"The nest was very warm and dry and perfectly arched over, though much more matted in the saucer than in the ceiling. The bottom of the nest was made of rather fine grass and some dry, dusty earth, in which were buried over 100 bulbs of the wild onion. This squirrel lay in the nest flatly on his sacrum, curled vertically, with the flat top of his skull pressed into his lap—a strangely uncomfortable position."

Our time had come! For months we had followed this quest. All this winter day we had toiled for it, and now, in the



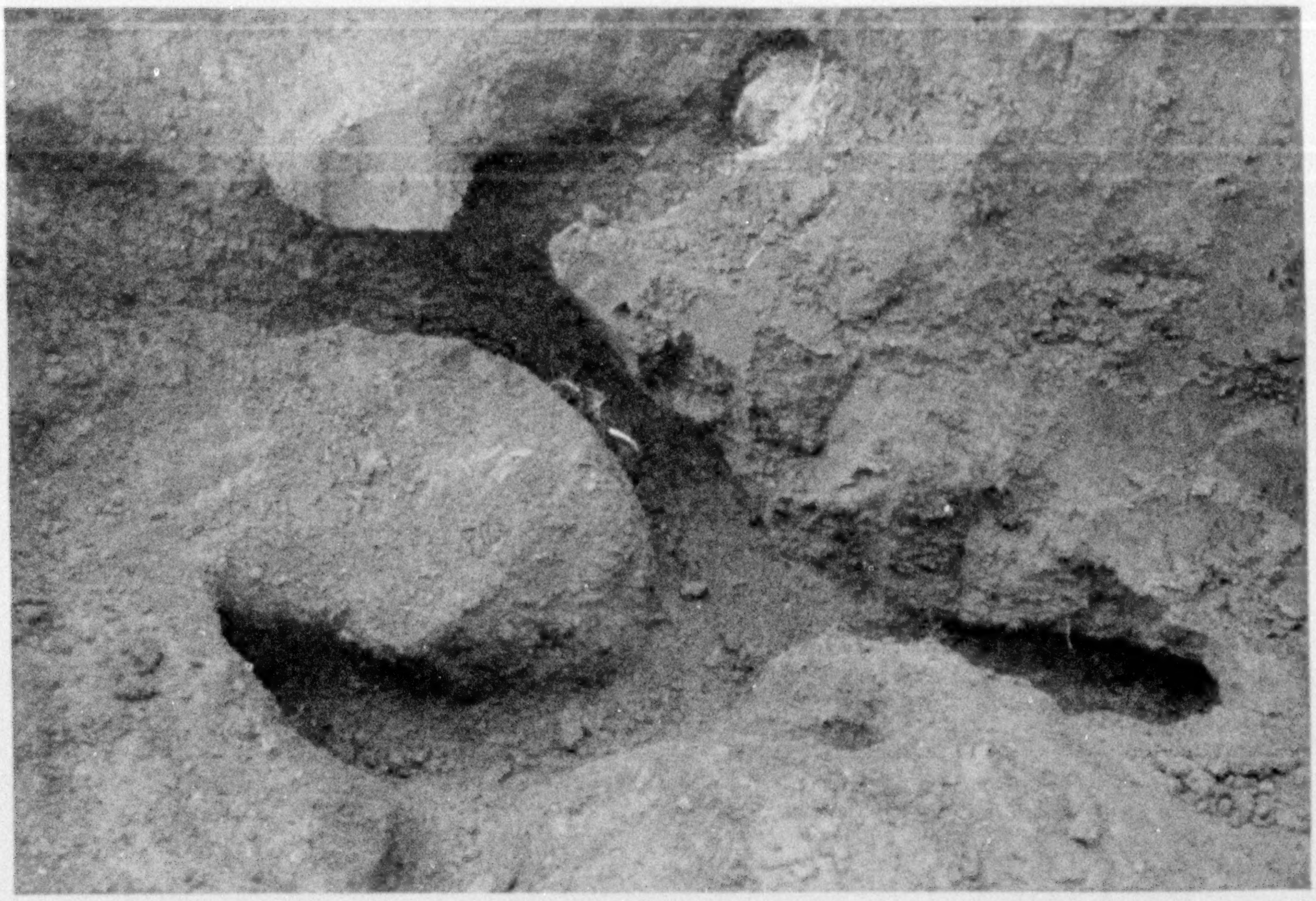
EXCAVATIONS MADE IN SEARCHING FOR HIBERNATING SQUIRRELS

At first, for fear that they were missing the squirrels, the investigators carefully followed every burrow. Later, before beginning the work of careful excavation, deep trenches were dug down to subsoil completely around the main body of the den for fear the squirrels might awaken and escape through some radiating burrow. A fairly large den may cover a radiating area of 30 by 40 feet.



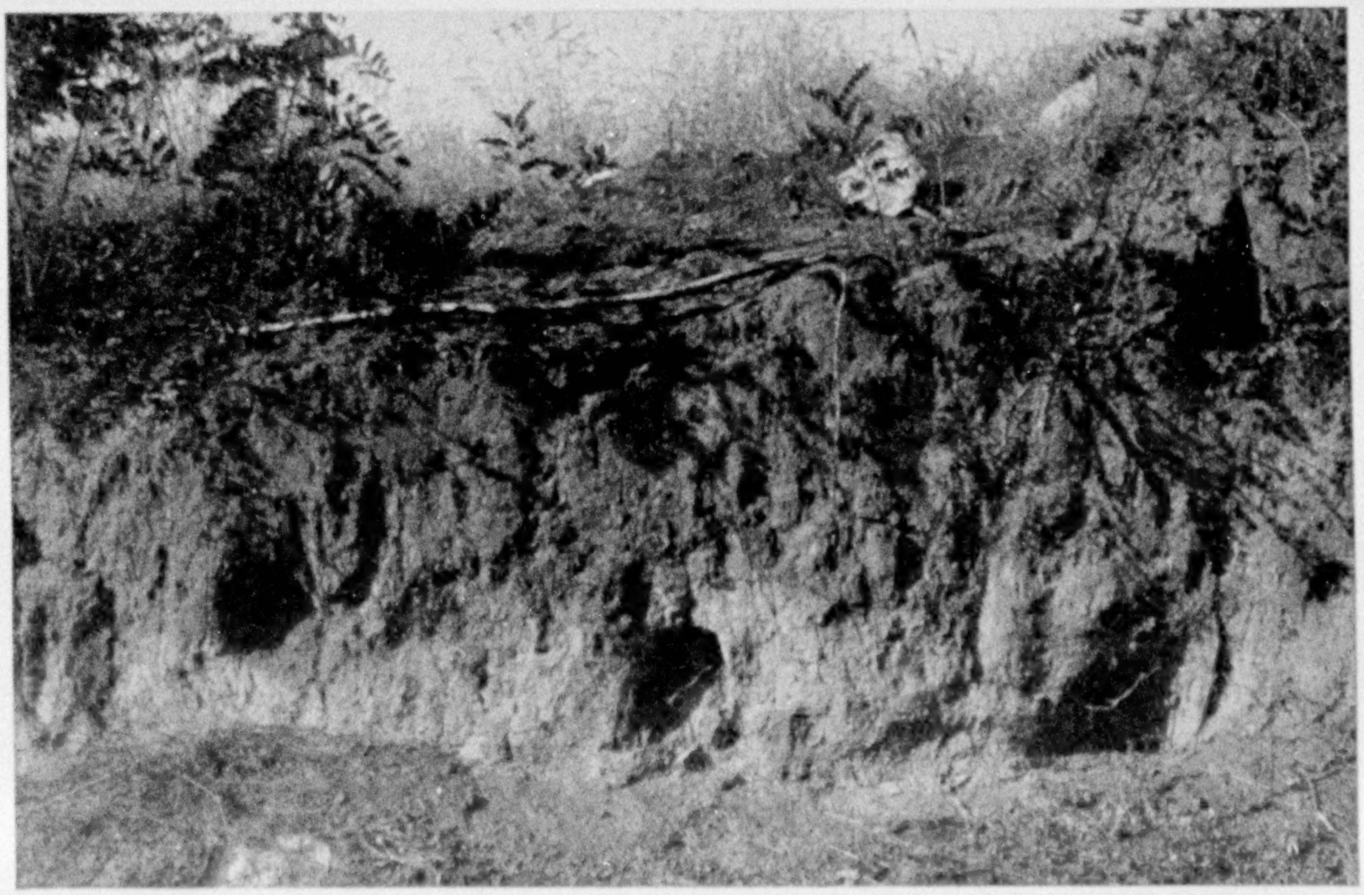
THE VERTICAL SECTION OF A HIBERNATING DEN

From the knife at the left is, first, the exposed nest; next, the round hole leading upward for the spring exit; and then the drain leading downward.



COLUMBIAN GROUND-SQUIRREL'S DRAIN

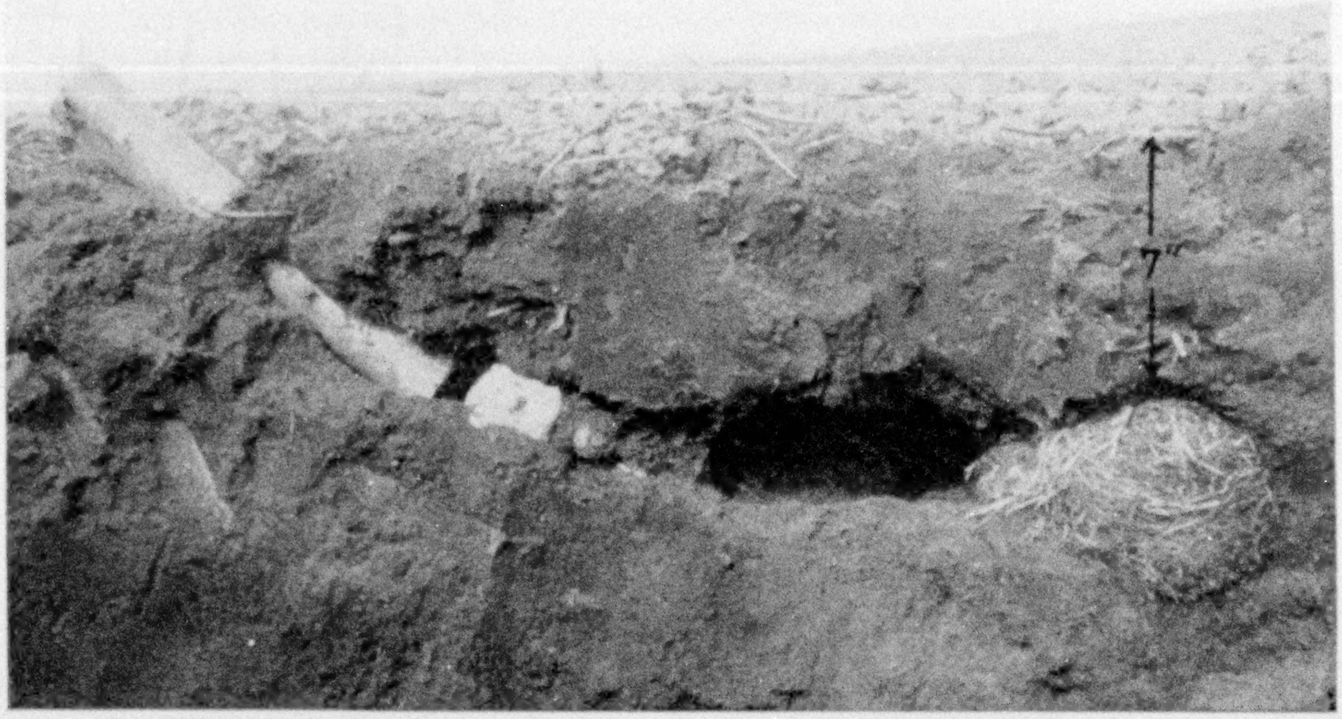
Associated with the typical hibernating den is a most remarkable adaptation intended to protect the squirrel from all ordinary danger of being flooded. It consists of a drain or series of connected drains leading away from the hibernating cell, and is so cleverly constructed that water poured in any of the burrows is carried safely past the hibernating nest.



VERTICAL SECTION OF THE SOIL SHOWING THE DEPTH TO WHICH THE BURROWS GO

The burrows usually spread out when they strike the harder subsoil, forming a network over its surface and sometimes penetrating it for a short distance.

XUM



THE DEN OF AN IMMATURE HIBERNATING SQUIRREL TREATED WITH CARBON BISULPHIDE (SEE TEXT BELOW)

The squirrel had put in a plug, just in front of the cotton, probably for the night, to exclude cold air. Notwithstanding this barrier, the gas had penetrated the plug and killed the animal in its nest, as shown in the vertical section of the den.

twilight, we obtained our first picture of a wild hibernating ground-squirrel, after a search of three years.

COMBATTING THE SQUIRRELS WITH GAS

While making a vertical section of a hibernation den for the purpose of photography, the idea suggested itself that some use might be made of these closed-in dens for the extermination of the animals when they awakened in the spring.

In the large summer dens the squirrels are at liberty to shift about at will, through a series of tunnels, with a capacity in some instances of nearly 300 feet of open burrow, together with many tunnels partially filled with loose earth, capable of being dug through rapidly or kicked up as a barrier in times of danger.

But it occurred to us that a gas might be used in the *hibernating* dens with deadly effect, for these contain not more than *seven* feet of burrow in contrast to the 250 or 300 feet of open tunnel in the summer den.

With the discovery of a shaft indicating where the spring exit would be, we realized the possibility of using the hibernation den as an aid in control methods. When, in February, small round holes began to appear, we entered upon our work of control.

Carbon bisulphide, an inexpensive liquid in its crude form, readily volatilizes when exposed to the air, becoming a poisonous gas, suffocating in its effect. This substance when introduced into the exit of the hibernating den immediately forms a heavy, deadly gas, which sinks at once into the recesses and results in a painless anesthetic death to the animal.

This substance has long been used against many forms of injurious animal life, and has been employed with effect against squirrels, even in the labyrinths of their summer dens; but its use in these restricted hibernating dens is proving wonderfully effective. The winter den is indeed a death-trap.

A vital principle of this method of destruction is that the squirrels killed are destroyed *before* the breeding season.

HELSINGFORS—A CONTRAST IN LIGHT AND SHADE

By Frank P. S. Glassey

American Vice-Consul at Helsingfors

A SNOW-COVERED city, muffled by a white cloak and shivering under a lowering gray sky—such is Helsingfors on almost any January day.

A city of darkness and brooding twilight, where the sun rises hesitatingly at 9 o'clock and then follows a quick course, always near the horizon, until it sinks rapidly again in mid-afternoon, as if eager to be on its way to a more hospitable land.

With the few daylight hours usually veiled by heavy clouds, electric lights burn overtime in offices and homes.

Finland in winter does not present a smiling face to the casual traveler, and although its capital is located on the southern shore of the country its residents pass a long and dreary period, from December until April, in surroundings popularized in fiction under the all-inclusive and descriptive caption of "the frozen North."

The city seems to be sleeping, even during the busiest hours of the day. Early in January the wide harbor is frozen over and the last vessel of the season scurries out in the trail of an ice-breaker, fretful of delays and anxious once more for the open sea, safe from the danger of spending several inactive months in the tightly-locked embrace of an icy gulf.

The streets of the city itself are but sparsely populated, and that only by a hurrying few intent on reaching a warm home where fur coats and caps may be laid aside and chilled hands may be thawed out before a cheery wood fire in a beneficent Finnish tile stove.

THE DROSHKIES STRIKE THE MOST PICTURESQUE NOTE IN FINLAND

Even the broad Esplanade is almost empty, and the only sound to echo through the sharp air is the bright tinkle of the bells on a *droshky*, as it glides smoothly and rapidly over the snow, or the deep guttural warning affected by the driver, as his horse makes a sharp turn at some corner.

The droshkies themselves, reminiscent of Russia, still strike the most picturesque note in the life of Helsingfors. This old method of transportation by sleigh has successfully battled against the competition of the taxicab, and every American who visits Finland wishes he could take back to the States just one such vehicle, with its sturdy horse, high-curved collar, and stout befurred driver, and place the combination at the corner of 42d Street and Broadway some wintry morning!

Although the Helsingfors winter is milder than one might imagine from its situation as the northernmost capital in the world, the city nevertheless has an abundant share of snow, particularly during the first three months of the year, when there is hardly a day without a further fall of white flakes.

A SUPERB SNOW-CLEANING SYSTEM

A street-cleaning system which is a marvel of efficiency and speed copes with this situation. Every person owning a home, apartment or office building is responsible not only for the cleanliness of the sidewalk in front of his property, but also for the removal of the snow from that part of the street on which his building fronts.

Every property owner may either engage private firms to keep clean his portion of public thoroughfare or may pay to the municipal authorities a fixed annual sum, thus shifting the entire responsibility to the shoulders of the city street cleaning department.

Law violation in this respect is almost unknown. An hour after a heavy snowfall a force of men and women is at work on every street, rapidly shoveling the snow into boxlike sleighs, which are then driven to the harbor, where their loads are dumped.

In addition to the method mentioned, a far more interesting plan of snow removal is followed. On the more important

Photograph by J. and P. Parikas

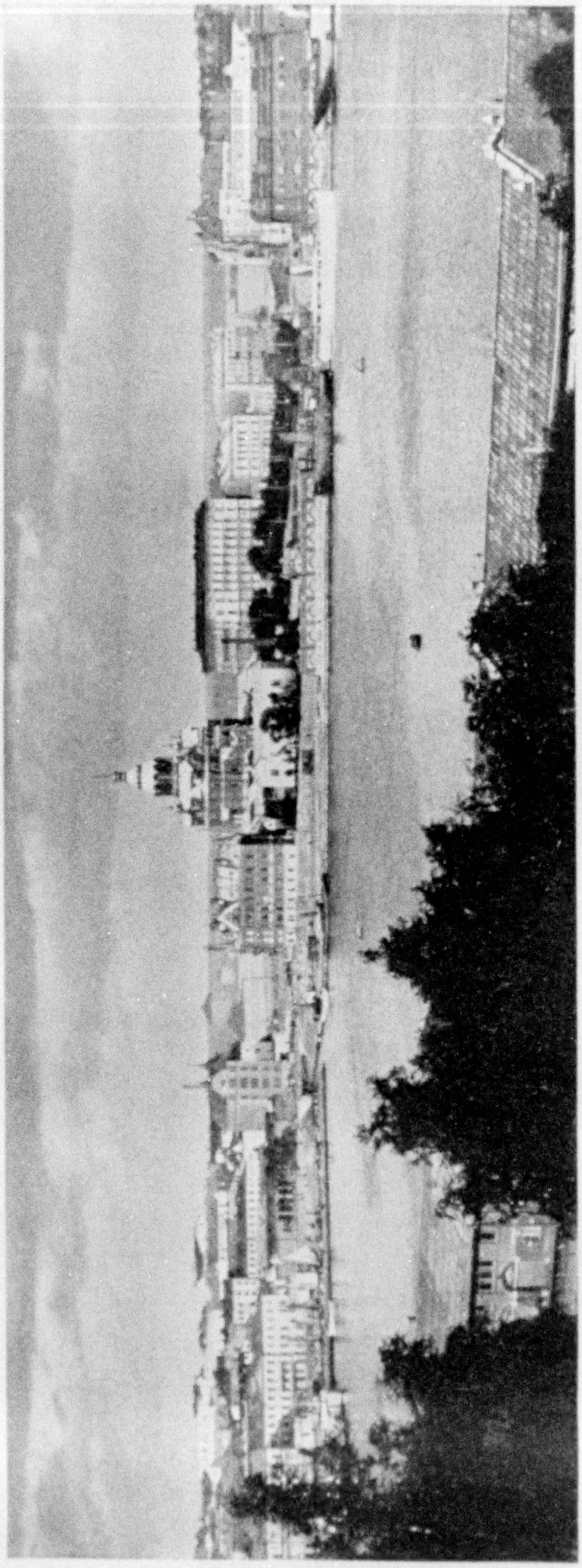
A PART OF THE HELSINGFORS SKY LINE

The harbor, with its fine granite quays, is one of the busiest parts of the Finnish capital. The Peninsula of Skatudden divides it into two parts; that known as the Södra Hamnen (South Harbor) is shown in the illustration. The Emperor Nicholas Church (see also page 609) is seen in the central background, and in the distance appears the tower of a church in the suburb of Berghäll (see page 607). The city edges the harbor in almost a semicircle and its finest buildings are set on heights.

Photograph from William W. Rock

THE OPEN-AIR FRUIT AND FISH MARKETS

The peasants, chiefly women, set up their stalls or booths in places assigned them by the police. Other venders come to the city in small sailboats and group their laden craft around the landing stage. The market is especially brisk in the morning, between 9 and 10, but there is another period of strained activity at noon, when booths must be hastily dismantled and unbought stocks piled in the carts for the return trip home.



Photograph by J. and P. Parikas

THE CATHEDRAL OF THE ASSUMPTION, SEEN ACROSS THE SÖDRA HAMNEN (SEE PAGE 598)

Completed in 1868, the white roofs and gilded domes of this Greek Catholic edifice are conspicuous far and near. Except for 50,000 members of the Eastern Orthodox Church, most of Finland's 3,400,000 inhabitants are Lutherans. The country was conquered in the 12th century and its people converted to Christianity largely by Bishop Henry, who, after being killed in fight, was canonized and became the patron saint of Finland.

streets the snow is literally burnt, or melted, by machines which originated in Finland and which have since found a market in other countries.

These machines are fired with logs, while three men shovel the snow into a large hopper, and as fast as it is offered to the huge maw it melts and the water runs through an outlet into the gutter and down a drain.

Although the contrivance is no novelty in Finland, its operation is always followed with the keenest interest by curious bystanders. Human nature once more shows its omnipresent desire for amusement, and the apparently simple method of melting a large mass of snow is always sufficient to attract a few admirers.

A WORLD ON SKIS

Helsingfors in winter is for the most part silent and subdued, white and ghostlike, austere and forbidding; yet it has its moments of relaxation.

On Sundays, particularly, one emerges from his home to find a world on skis. Man has abandoned the stiff and formal walk to glide, generally grimly intent on progress, over the snow-coated ice of the harbors to the islands that fringe the city in every direction.

Photographs by J. and P. Parikas

THE SOUTH HARBOR QUAYS, WITH THE CATHEDRAL OF THE ASSUMPTION IN THE BACKGROUND: HELSINGFORS

Finland has always maintained communication with the Western World through the two long gulfs of the Baltic Sea by which it is embraced. Finns are skillful sailors, and the vast forests of the republic have yielded cheap and excellent material for shipbuilding. The republic's commercial fleet of to-day comprises more than 5,000 vessels. It maintains communication with Stockholm, 16 hours across the Baltic, and with Stettin, in Germany, 36 hours distant. A direct steamer service under the Finnish flag also links Helsingfors with Hull, England, and Copenhagen, Denmark.

Photograph by J. and P. Parikas

ISLANDS WHICH GUARD THE SOUTH HARBOR OF HELSINGFORS

The Finnish capital is invisible from the sea until the steamer passes through a mighty cleft in a granite wall, the only entrance and exit to one of the best-guarded harbors in the world, aptly termed the Key of the North. The South Harbor, on the east side of the city and south of Skatudden Peninsula, is the principal commercial harbor. Navigation is closed from early in January to the latter half of April. Helsingfors can be reached from Tallinn (Reval), capital of Esthonia, in an afternoon's sail.

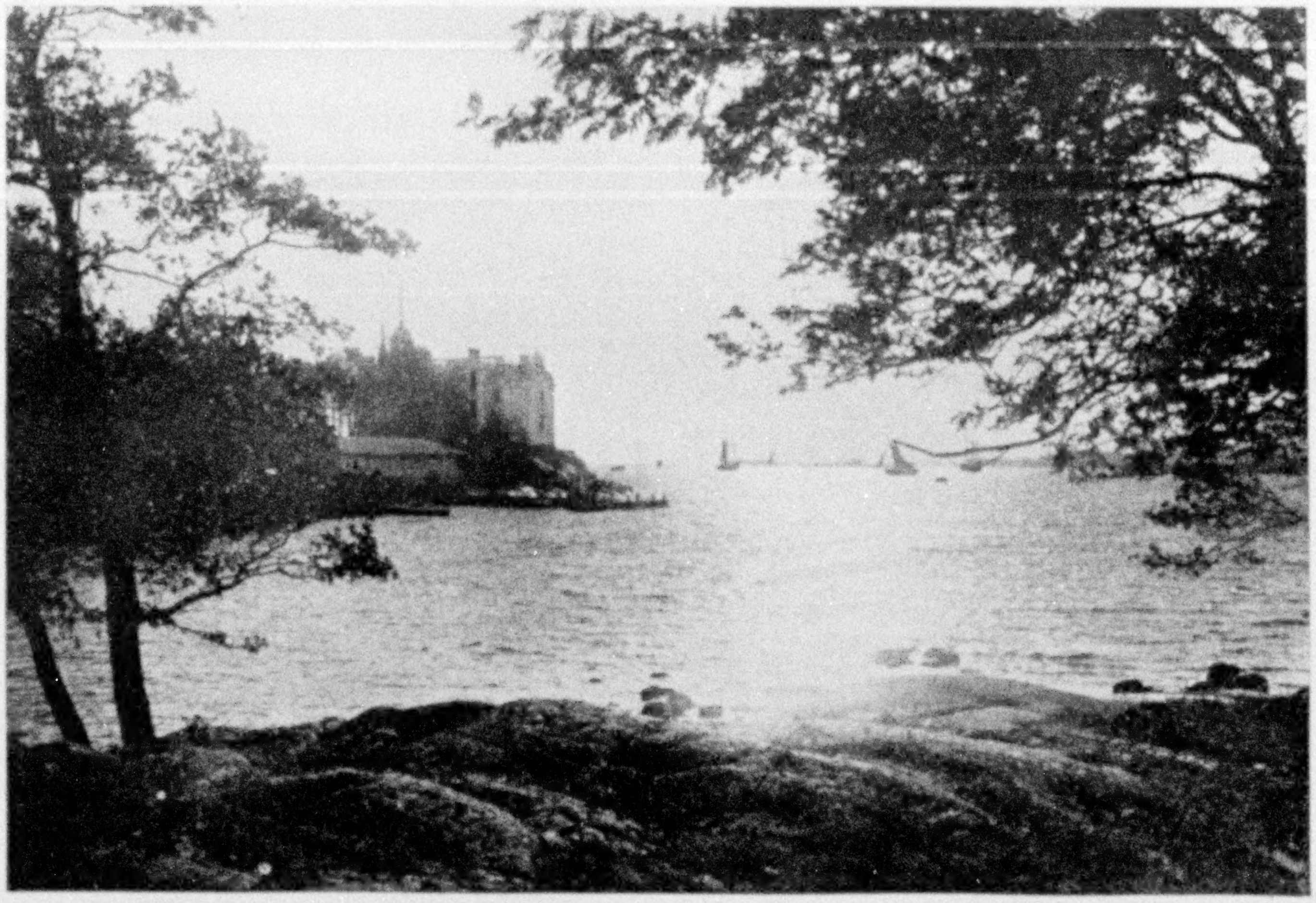
Photographs by J. and P. Parikas

RESIDENTS OF ÖSTERBOTTEN, FINLAND

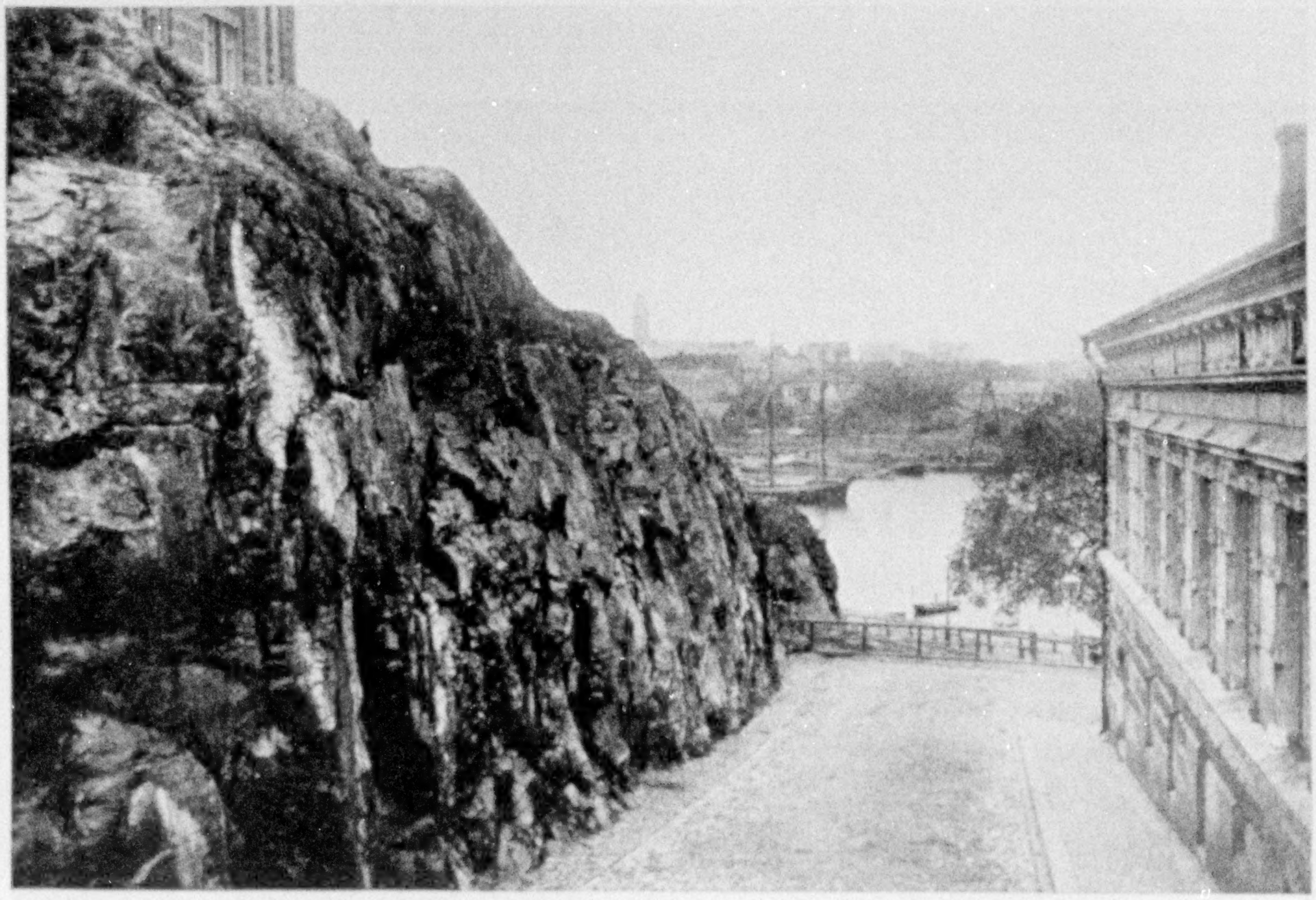
Their home lies south of Lapland, along the northeast shores of the Gulf of Bothnia. Marshes and forests cover the interior and the population is confined in the main to the coast line. Finnish costumes are colorful and picturesque, but are only occasionally seen nowadays in country districts.

GIRLS FROM THE ÅLAND ISLANDS

The inhabitants of this group of some 300 islands and rocky islets, now belonging to Finland, are mainly of Swedish descent, and live by fishing and cattle-raising. The girl to the left is a native of Saltvik, the hills of which are admired for their picturesque cliffs of red granite. The girl to the right is from the island of Houtskär.



A GLIMPSE OF THE HARBOR OF HELSINGFORS



Photographs by J. and P. Parikas

OVERLOOKING HELSINGFORS

To Americans, Finland's capital is Helsingfors, but the Finns know it as Helsinki. Similar changes of official names of capitals have taken place in several countries in Europe since the World War. Prague, in Czechoslovakia, has become Praha, the Poles are insisting upon Warszawa for Warsaw, the Esthonians ask that we think of Reval as Tallinn, and in January the Norwegians changed Christiania to Oslo.

THE MARKET PLACE, OR SALU-TORG, LOOKING NORTH: HELSINGFORS

Photographs by J. and P. Parikas

A LAUNCH LANDING ON HÖGHOLMEN

The island of Högholmen is situated close to Helsingfors and contains a zoölogical garden. Its parklike scenery and pretty gardens surrounding a restaurant make it a favorite place of excursion for picnic parties of the humbler classes. Meals can be cooked at queer little fireplaces in the ground and eaten in the open air. The suburb of Berghäll is seen in the background (see also page 607).

Photograph by J. and P. Parikas

THE UNIVERSITY AS SEEN FROM SENATE SQUARE: HELSINGFORS

The supremacy of Helsingfors as the capital of Finland was confirmed by a disastrous fire in the historic city of Åbo (Turku) in 1827, which led to the removal of the university to the capital. Its student body of 3,000 includes many women. The Finn has long appreciated the value of education, and one of the university's cherished relics is a primer of 1542, the first book printed in Finland. A story is also told of Finnish fugitives from Tsar Peter's soldiers, who, when hiding in the woods during "the reign of hate," carved the A, B, C's on wooden tables for their children. Finland has two smaller universities, one Swedish and one Finnish, at Åbo.

Occasionally in large parties, but more often in couples or alone, everyone is skiing. Girls in flamboyant sports costumes, men in sweaters and knickerbockers — all push along.

You may follow one crowd to a hill, where you can witness marvelous and hair-raising jumps, and equally thrilling falls, as some unhappy individual turns over and over and, if he does not conclude his journey by forcible contact with tree or rock, finally appears upright again on the two wooden runners.

Probably he will repeat the experiment until he meets with success; for skiing is a serious sport, not to be taken frivolously; but always demanding a full measure of devotion from its disciple. What baseball is to America, skiing is to Finland.

This is not, of course, the only winter sport, although the dominant one. There is skating on the large public rinks in the harbor, and there are spirited ice-hockey contests. Even automobile races are staged on the ice, and these, it may be remarked, are as productive of thrills as the most *blasé* devotee of sport could desire.

In the evening the restaurants, with dancing, the opera and the movies all draw

Photograph by J. and P. Parikas

THE NEW CHURCH IN THE BERGHÄLL SUBURB OF HELSINGFORS

This imposing edifice, built by Lars Sonck in 1912, stands on a small hill and commands an admirable view. Before Alexander I transferred Finland's seat of government from Åbo to Helsingfors, in the early years of the 19th century, the latter was a small and unimportant town. Since then it has grown rapidly and to-day it has 200,000 inhabitants.

A WOMAN CONDUCTOR ON A HELSINGFORS STREET CAR

Women are engaged seemingly in every branch of work in Finland, and this country was the first in Europe to have woman suffrage. One reason for such action was that Finland's struggle for existence has been hard, and it could not afford a large nonproducing class. Women outnumber men in Finland by 44,000, in a total population of 3,400,000.

Photograph from William W. Rock

FISHWIVES SELLING THEIR HUSBANDS' EARLY MORNING CATCH

In brilliant skirt and smock, the fishwife is the most vivid of the colorful throng at the daily market. While the Finns are fishing, their wives bring the catch to the market. It is especially exciting when the autumn sailing fleet comes in to sell provisions for the winter, and again on the day when the ice breaks up in the spring and the first vessel of the year steams in to the quays. The Helsingfors housewife usually comes to market and does her own purchasing of vegetables and meat, and rarely leaves without the inevitable handful of bright, hardy flowers.

an appreciable patronage from the city's population.

But skiing is still unthreatened by any formidable competitor, and one feels that winter is ushered out as it was escorted in—by a throng whose banner bears two crossed skis rampant on a field of snow.

WHEN SPRING COMES TO FINLAND

The transition from winter to spring and from spring to summer is something startling to an outlander, for a new world seems to be created under his eyes almost overnight. He has welcomed the first warm days of early April, watched with a feverish joy the melting of the snow, and has developed a somewhat fiendish obsession that makes him count every trickling stream which forecasts the disappearance of the crust of ice from street and sidewalk. And then it has snowed again, and the thought of spring dwindles to a forlorn hope.

In a like manner, the rapid lengthening of the days loses much of its meaning, for there is still a sharp tang to the air morning and evening. Yet this constant flood of light, prolonged through the greater part of every 24 hours, has an uncanny effect upon the trees, grass, and foliage.

For one night, after watching the sun set about 8 o'clock, you will go to bed longing for a climate that would afford a relief from a continually gaunt, dreary, and bleak outlook. And you will awake to find that spring has arrived unheralded; that the trees show a tinge of green, and that the grass is actually prying its way through the blanket of snow.

Patches of warm earth appear in the parks, a few venturesome individuals ride

A VISTA FROM OBSERVATORY HILL: HELSINGFORS

The bronze group "Shipwrecked," by Robert Stigell, stands next the sea, on the east side of Observatory Hill, which is laid out with recreation grounds and affords a pleasing panorama of the town. The gardens are well kept and form one of the attractions of the capital, especially in summer, when they are aglow with color.

Photographs by J. and P. Parikas

EMPEROR NICHOLAS CHURCH: HELSINGFORS

This Lutheran edifice stands upon a huge mass of granite 59 feet above the level of Senate Square and is approached by an exceedingly broad flight of 45 steps. Its immense bulk is visible for many miles at sea and from its central dome can be had the best view of the city and its surroundings.

XUM

Photograph courtesy Legation of Finland

WHEN FINLAND CELEBRATED ITS INDEPENDENCE AT HELSINGFORS

Members of the civil guard and the army are gathered before the Senate House in commemoration of General Carl Gustav Emil Mannerheim's solemn entry into Helsingfors in May, 1918. Though Finland declared its independence on December 6, 1917, a short period of bloody civil strife, complicated by foreign interests, followed before its separation from Russia was complete. Senate Square, flanked by edifices in the classical style, is architecturally the most imposing section of Helsingfors. Many of the fine buildings were designed by C. L. Engel, known as the "father of Finnish architecture."

to their work on bicycles, the ice in the harbor loses its steadfast aspect, office managers order the removal of double windows—spring has come to Finland.

Within the next few days all the outposts of winter make an inglorious retreat. The cobbled streets gleam naked under the sun's rays, and the droshky drivers consign their sleighs to storage and appear, jauntily flourishing their whips, in high-wheeled carriages strangely resembling the old victoria. One feels that in order to make a proper journey in this vehicle cheering crowds should line the streets and force a dignified rider to bow at intervals of some seconds.

The ice pack in the harbor finally disappears altogether, the first vessel of the year steams in, and Finland's short spring gives way to summer. A cool summer, it is true, and often a rainy one; but summer for all that, with endless outdoor life, endless daylight, and endless merrymaking.

THE DAILY CITY MARKET A PLACE OF COLOR AND ACTION

Probably no activity in Helsingfors is more interesting to the summer visitor than the open-air market every morning on the broad square near the South Harbor. Daily, before the average city dweller is awake, the peasants drive in their native carts from the near-by country with fruit, vegetables, meat and fish, flowers, dry goods, household utensils, and every other conceivable article of domestic commerce.

These peasants, chiefly women, rapidly set up small booths or stalls in the places assigned them by the police, and for four hours they ply a busy and extensive trade with the city housewives, who usually come to purchase vegetables and meat

Photograph by J. and P. Parikas

A CORNER OF THE KAJSANIEMI PARK: HELSINGFORS

The old Helsingfors, of one-storied, low-roofed wooden houses, has given place almost entirely to the new city, with its spacious streets, imposing buildings, and parks. In summer the middle class lives in attractive villas on the hundreds of near-by islands, commuting by means of steamboats.

and depart with the inevitable armful of flowers as well.

Meanwhile other venders who have made the journey to Helsingfors in small sailboats group their craft around the landing stage and draw their customers from the outskirts of the buying throng.

The market, with its hundreds of stalls, its shifting mass of humanity, and its occasional vividly costumed fishwife in brilliant smock and skirt, forms a spectacle picturesque in a superlative degree. Only slightly less so is the strained activity at noon, when the booths are hastily dismantled and, with the unbought stocks, piled again in the high-wheeled carts for the return trip to farm or country cottage.

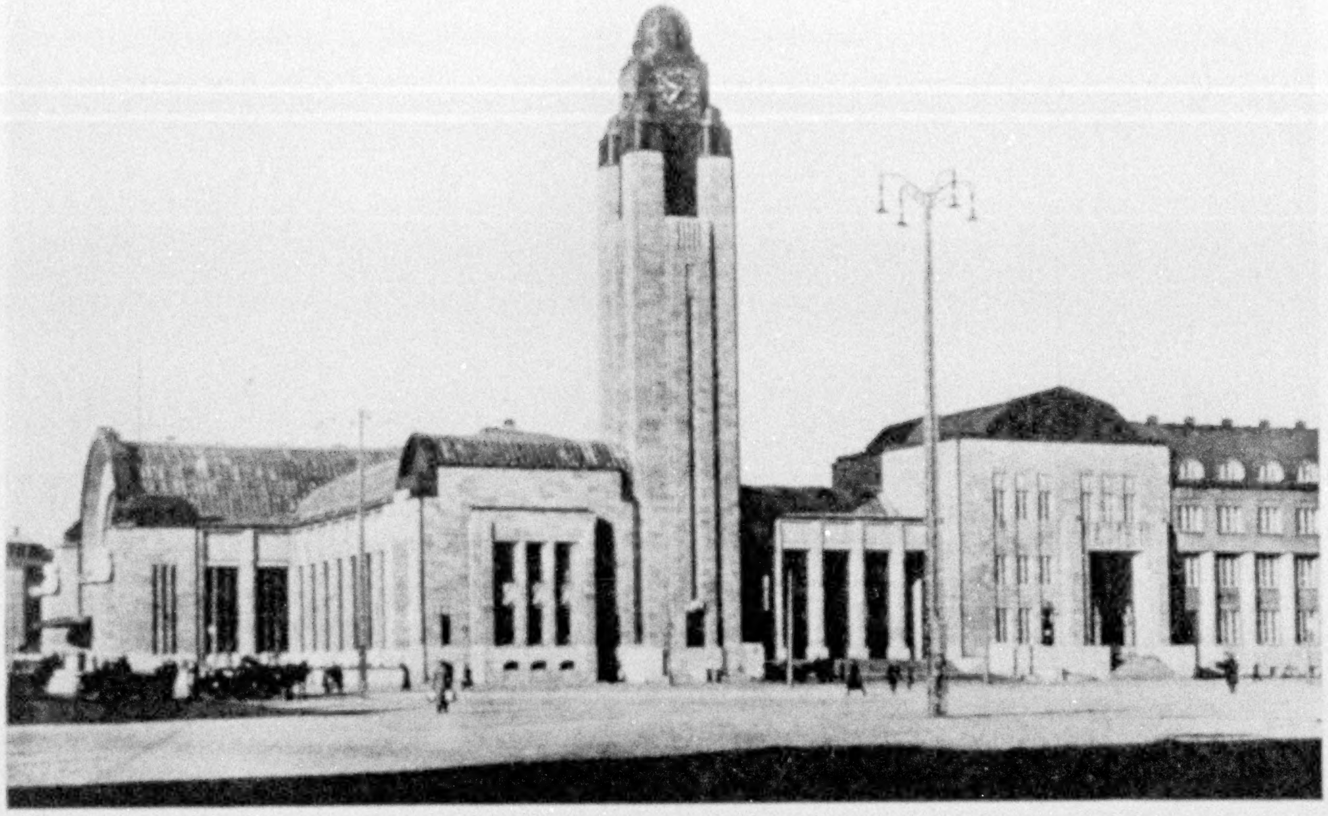
Then follows an example of Finnish efficiency and the local passion for cleanliness. Scores of women descend on the market place, armed with Gargantuan brooms, with which they valiantly attack the waste and refuse, while men wielding powerful hose assist the Amazonian host. Within ten minutes the entire square is in a state of admirable spotlessness, and so it remains until the next morning.

POPULATION MOVES TO THE ISLANDS IN SUMMER

Helsingfors in summer is the commuter's paradise. On the first of June begins the migration islandward, and in attractive villas on the hundreds of islands surrounding the city virtually the entire middle-class population lives for three months.

Instead of sprinting madly for the 8:13 train after breakfast the wage-earner of the house strolls leisurely to his dock and waits placidly for one of the small steamboats that will take him to Helsingfors and business

The 5:15 return boat in the evening is a different institution, however, and is always wildly pursued by the last-second commuter who crosses the gangplank just



Photograph courtesy Legation of Finland

THE RAILWAY STATION AT HELSINGFORS

Designed by the Finnish architect Saarinen, this striking edifice signifies the republic's faith in its future development. Its severe mass stands in an immense square, paved and treeless. Finland has expended large sums in the development of state railways, highways, and waterways. Some of the rail lines pass through vast uncultivated districts to link up the farthest outlying sections.

as it is being drawn in, and who then sinks breathlessly but gloatingly into a seat, conscious of another victory won.

OUTDOOR LIFE RESPONSIBLE FOR SPLENDID ATHLETES

This island life is truly a worship of Nature, just as the famous Midsummer Day is a survival of prehistoric sun adoration. Every June 23d Helsingfors declares a holiday, in common with all Finland, and spends 24 hours in the open beneath an endlessly bright sky. As the sun makes its temporary dip below the horizon about 11:30 in the evening, the *kokko* fires blaze in every direction—huge bonfires, thousands of them on hundreds of islands.

For the rest of the night every man joins with his neighbor in feasting, dancing, and community singing, and when the sun appears once more, about half past one in the morning, its greeting from Finland is royal indeed.

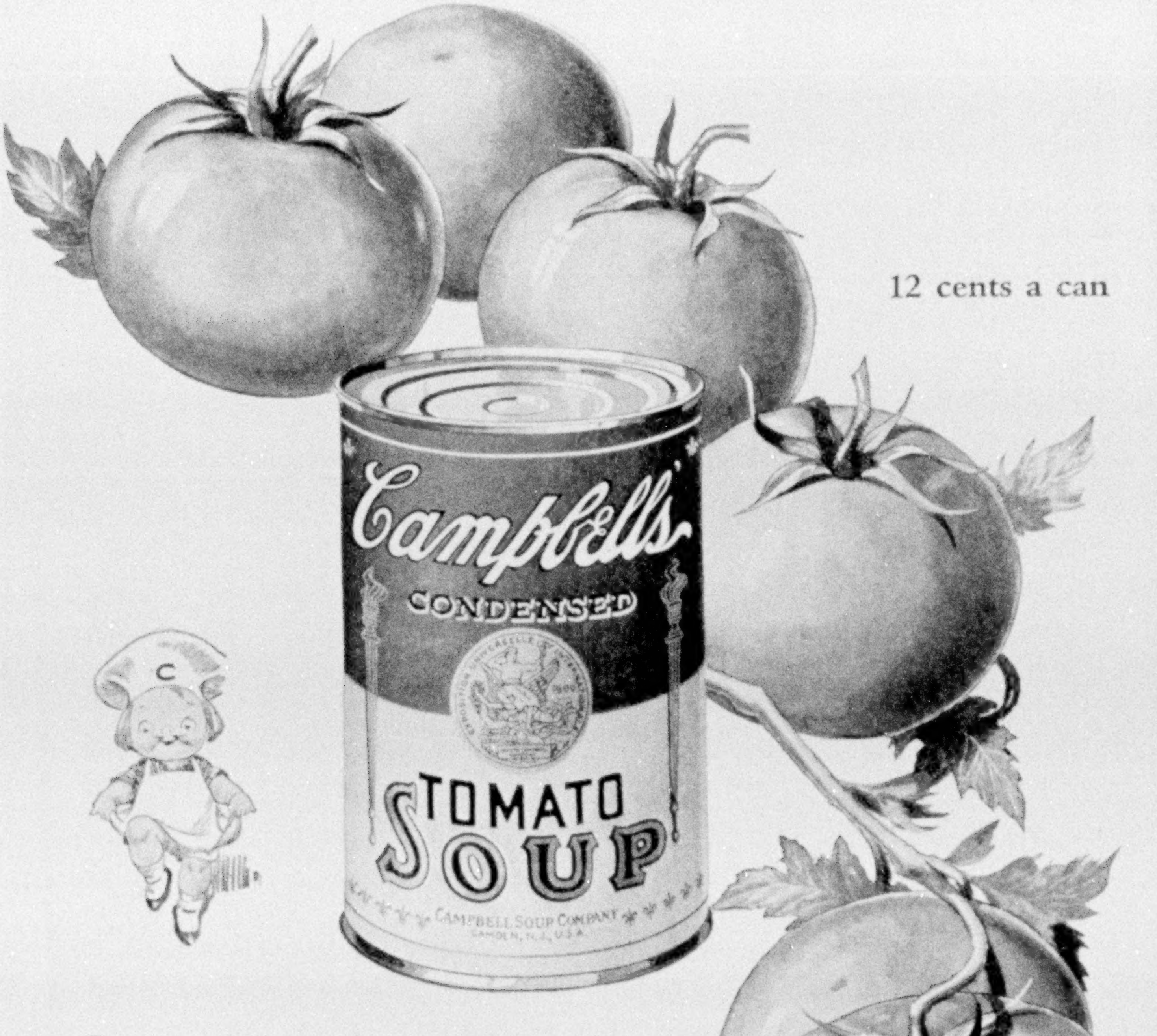
With an almost continual outdoor existence among the Finlanders, summer sports flourish and thrive. The track athlete makes new world's records, the association football teams monopolize every playground, and the swimmer invents new methods of high-diving to flirt with death.

And winter's ubiquitous skier figuratively beats his skis into a trim sailboat and goes forth on to the gulf as another proof of the reason for Finland's maritime fame.

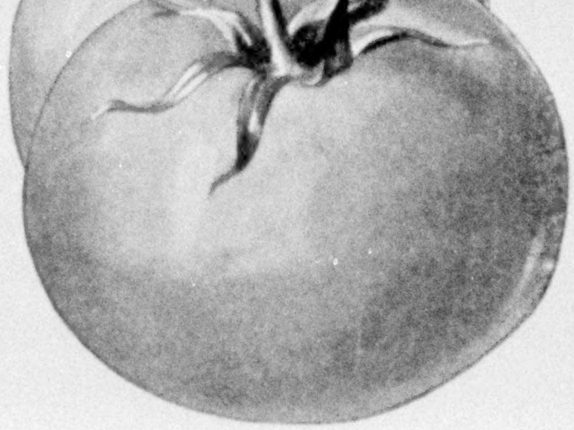
Helsingfors is quiet at night, but one's final impression in the early evening is of a changing crowd on the Esplanade, of a bright national costume flashing beside the brilliant uniform of an officer or the drab outfit of a private soldier.

And these couples—for the mass seems composed only of couples—all turn for one last round of coffee and sweet cakes toward an outdoor café, where they revel in the strains of one of the lively military bands which is playing a late American fox trot.

Bringing the tomato's glory to all the world!



12 cents a can



To National Geographic readers with their keen interest in the whole wide world and how its people live, here is an interesting fact:

Campbell's Tomato Soup is known, liked and eaten in every land under the sun. The famous Red-and-White label greets the tourist in every clime.

French chefs. Celebrated American kitchens. International fame. Only a product of strict and uniform quality could win such applause.

Campbell's Soups

LOOK FOR THE RED AND WHITE LABEL

Americans will not wait

Accustomed to instant communication by telephone and telegraph, our military authorities realized in the late war that the American Expeditionary Forces could not depend on the communication services of Europe.

The necessary plans, materials and engineers were sent over in ship loads. A world record was made by the Signal Corps in establishing lines of communication indispensable to every branch of the army. In a surprisingly short time, every American general in France had at his instant disposal the communication facilities and service to which, in America, he had been accustomed.

Europe was sometimes startled by the amazing methods of the telephone workers from overseas. The American-trained Signal Corps units invariably sought the shortest way, overcoming all natural obstacles to extend the needed means of communication.

The Americans were not content to wait. They expected and demanded the same ever-ready telephone connections which they had at home. The Bell System has set a world standard for prompt attention and continuous service.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

One Policy, One System, Universal Service

There and back .... *through coupons*

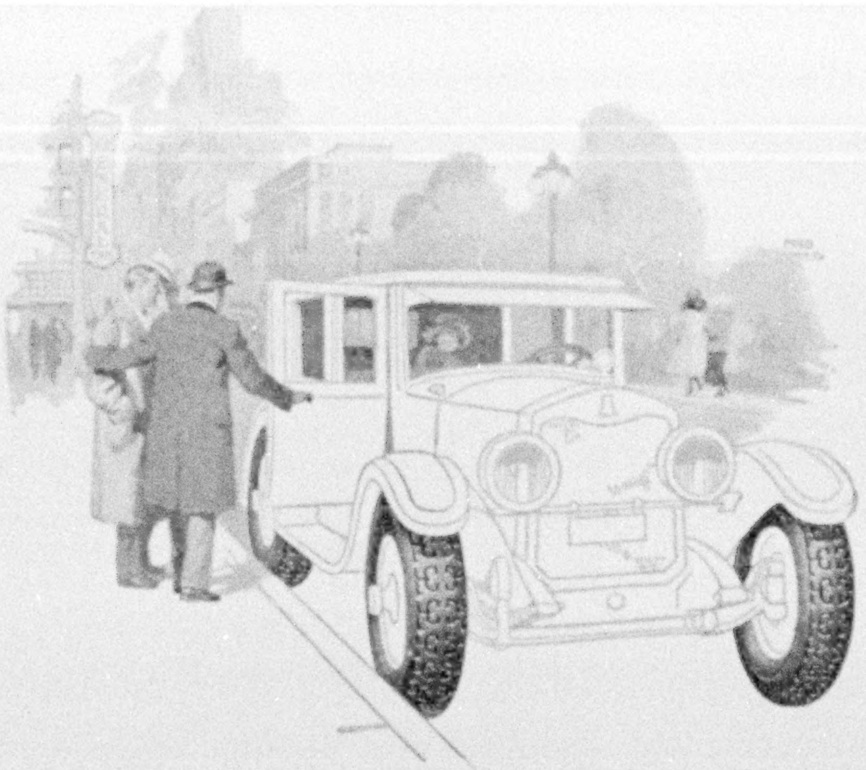
A trip, a holiday, a tour or a journey through life becomes plain sailing through the coupons of well-secured bonds—the result of investment guided by experienced counsel. We will gladly assist you in selecting carefully investigated issues from our regular lists. Information and advice at your command through offices in 50 leading cities.

THE NATIONAL CITY COMPANY

National City Bank Building, New York

BONDS · SHORT TERM NOTES · ACCEPTANCES

XUM



After your Generals have run 10,000 miles

Users seem to take an unusual pride in the long mileage they get from their Generals. And in every community the exclusive General distributor is the type of tire merchant who realizes that user satisfaction is his true merchandise.

More thoughtfulness on the part of owners toward their tires and an interest beyond the sale on the part of the General distributor is a combination that makes for the success of one and the greater satisfaction of the other.

So, after your Generals have run 10,000 miles, drive to the General distributor. By giving the proper attention to the nicks and small injuries that result from big mileage he can add many months of service to the further mileage that is left in the tires.

The Mark of Leading Tire Stores Everywhere

Even if you trade in your car each year, the extra mileage in the General Cords is not lost, because tires in good condition add more to the trade-in value of your car.

Longer car life, more motor power, less gasoline and longer tire wear are the four biggest economies to be found in tires.

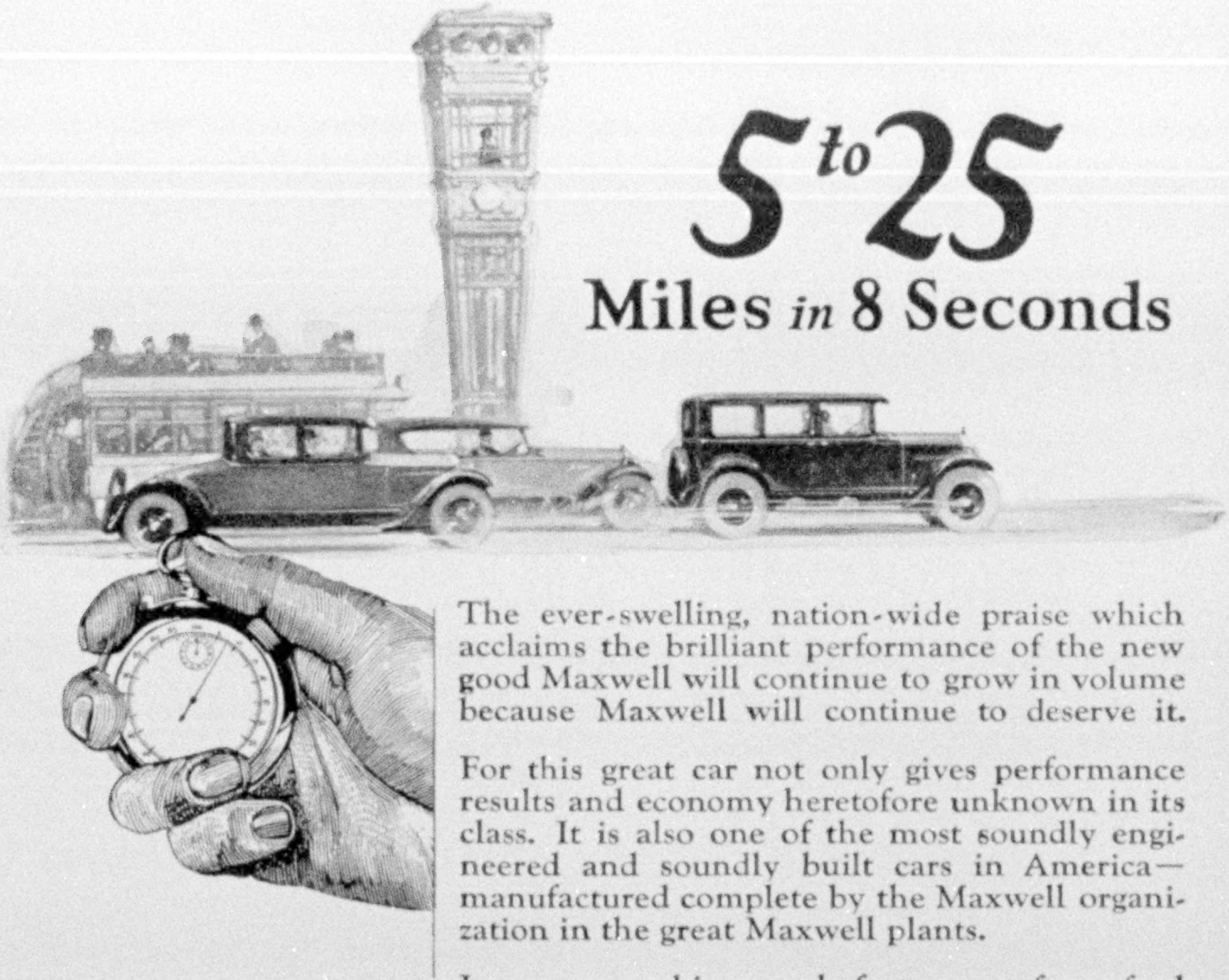
The

GENERAL

CORD

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER COMPANY



5 to 25 Miles *in* 8 Seconds

The ever-swelling, nation-wide praise which acclaims the brilliant performance of the new good Maxwell will continue to grow in volume because Maxwell will continue to deserve it.

For this great car not only gives performance results and economy heretofore unknown in its class. It is also one of the most soundly engineered and soundly built cars in America—manufactured complete by the Maxwell organization in the great Maxwell plants.

Its motor combines such features as force feed lubrication and fine balance of reciprocating parts—structural practice before confined to cars costing far more. Its transmission and its rear axle, are big enough and strong enough for the most strenuous daily service and the most powerful lugging through deep sand and mud.

The new good Maxwell owner enjoys his 58 miles per hour, 5 to 25 miles in eight seconds, and 25 miles per gallon in the knowledge that this prized combination is exclusive and distinctive to the new good Maxwell alone.

You will find all Maxwell dealers eager to prove these truths.

58 Miles *per* **Hour**

25 Miles *to the* **Gallon**

Balloon tires, natural wood wheels, stop-light, transmission lock, Duco finish *standard* on all Maxwell models. Shrouded visor integral with roof; heater, standard on all closed models.

Touring Car - -	*$895*	*Standard Four-Door Sedan*	*$1095*
Club Coupe - -	*995*	*Special Four-Door Sedan -*	*1245*

All prices f. o. b. Detroit, tax extra

There are Maxwell dealers and superior Maxwell service everywhere. All dealers are in position to extend the convenience of time-payments. Ask about Maxwell's attractive plan.

MAXWELL

The New Good
MAXWELL

XUM

"Your Daddy Loved Me—

And I Looked Like That!"

A flexible shoe for your flexible foot

The flexible arch makes the Cantilever a wonderfully comfortable shoe. It permits the foot to be natural. Foot muscles can exercise and gain the strength they need to hold the twenty-six bones of the foot in strong, springy arches.

And you will enjoy the easeful fit afforded by the natural lines, the snug-fitting heels and the rounded toes of Cantilevers.

Many women will tell you about the comfort of Cantilevers, if you ask them, just as they tell us. Mrs. I. P. H. of Everett, Wash., wrote, "I have often wished that all my friends would try Cantilevers, as I had tried everything else before I found perfect fit, comfort and style with them, two years ago."

"WHOEVER designed the women's fashions in those days just hated the thought of comfort. They look funny to you, but it would be no joke if you had to wear them."

Layers of petticoats, stiffened collars, armor-like corsets, big hats worn high up on the head to catch the wind, narrow pointed shoes that caused torture, all tended to limit the healthful activities and happiness of women.

Today fashionable women dress comfortably. They enjoy life more completely and accomplish more. For one thing, they find that Cantilever Shoes are distinctly in keeping with the present universal appreciation of simple, graceful, comfortable styles.

Modishly rounded toes, graceful, natural lines, moderate heels and snug-fitting, flexible arches make Cantilevers fit the foot with ease and comfort. Wear them all day. You will be gratefully surprised to feel the increased "lift" and endurance they give you. Comfortable Cantilevers are indeed the footwear of the times.

There are attractive pumps, in tempting varieties, and a number of trim oxfords which will be in good taste for wear with tailored spring suits.

Cantilever Shoe

If none of the stores below is near you, write the manufacturers, Morse & Burt Co., 418 Willoughby Avenue, Brooklyn, N. Y., for the address of a more conveniently located Cantilever store.

Cantilever Stores—Cut this out for reference

Akron—11 Orpheum Arcade (Main & Market)
Albany—Hewett's Silk Shop, 15 N. Pearl St.
Allentown—907 Hamilton St.
Atlanta—126 Peachtree Arcade
Atlantic City—2019 Boardwalk (near Shelburne)
Baltimore—325 North Charles St. (2nd floor)
Bangor—John Conners Shoe Co.
Binghamton—Parlor City Shoe Co.
Birmingham—319 North 20th St.
Boise—The Falk Mercantile Co.
Boston—109 Newbury St. cor. Clarendon St.
Bridgeport—1025 Main St. (2nd floor)
Brooklyn—516 Fulton St. (Primrose Bldg.)
Buffalo—641 Main St. (above Chippewa St.)
Burlington, Vt.—Lewis & Blanchard Co.
Calgary—Hudson's Bay Co.
Charlotte—226 North Tryon St.
Chicago—162 N. State St. (opp. Chicago Theatre); 1050 Leland (near Broadway); 6410 Cottage Grove Ave. (Woodlawn)
Cincinnati—The McAlpin Co.
Cleveland—1705 Euclid Ave.
Columbus, O.—104 E. Broad St. (at 3rd)
Dallas—Medical Arts Bldg.
Dayton—The Rike-Kumler Co.
Denver—224 Foster Bldg.
Des Moines—W. L. White Shoe Co.
Detroit—2038 Park Ave. (at Elizabeth St.)
Duluth—107 West First St. (near 1st Ave., W.)
Edmonton—Hudson's Bay Co.
Elizabeth—258 No. Broad St.
Evanston—North Shore Bootery
Evansville—316 So. 3rd St. (near Main)
Fort Wayne—Mathias App's Sons
Fort Worth—Washer Bros.
Grand Rapids—Herpolsheimer Co.
Harrisburg—26 No. 3rd St. (second floor)
Hartford—Trumbull & Church Sts.
Houston—205 Foster-Bank Commerce Bldg.
Huntington, W. Va.—McMahon-Diehl
Indianapolis—L. S. Ayres & Co.
Jacksonville, Fla.—Opposite Seminole Hotel
Jersey City—Bennett's, 411 Central Ave.
Kansas City, Mo.—300 Altman Bldg.
Knoxville—Spence Shoe Co.
Lincoln—Mayer Bros. Co.
Little Rock—417 Main St. (Pugh Bldg.)
Long Beach, Cal.—336 Pine Ave.
Los Angeles—728 Hill St.
Louisville—Boston Shoe Co.
Lowell—The Bon Marche
Madison, Wis.—Family Shoe Store
Memphis—28 No. Second St.
Miami—Dickins Shoe Store
Milwaukee—Brouwer Shoe Co.
Minneapolis—25 Eighth St. South
Mobile—F. H. Britton
Montreal—Keefer Bldg. (St. Catherine, W.)
Mount Vernon, N. Y.—A. J. Rice & Co.
Nashville—J. A. Meadors & Sons
Newark—897 Broad St. (2nd floor)
New Bedford—Olympia Shoe Shop
New Brunswick—A. V. Harding & Sons
New Haven—153 Court St. (2nd floor)
New Orleans—109 Baronne St. (Room 208)
New York—14 W. 40th St. (opp. Public Library); 2956 Third Ave. (152nd St.); 13 John St. (Bet. B'way and Nassau)
Norfolk—Ames & Brownley
Oakland—516-15th St. (opp. City Hall)
Oklahoma City—Fexler's Boot Shop
Omaha—1708 Howard St.
Pasadena—378 E. Colorado St.
Passaic—4 Lexington (at Erie Depot)
Paterson—19 Park Ave. (at Erie Depot)
Pawtucket—Evans & Young
Peoria—105 So. Jefferson St. (Lehmann Bldg.)
Philadelphia—1932 Chestnut St.
Pittsburgh—The Rosenbaum Co.
Pittsfield—Wm. Fahey's, 234 North St.
Plainfield—M. C. Van Arsdale
Portland, Me.—Palmer Shoe Co.
Portland, Ore.—353 Alder St.
Providence—The Boston Store
Reading—Sig. S. Schweriner
Richmond, Va.—Seymour Sycle
Roanoke—I. Bachrach Shoe Co.
Rochester, N. Y.—257 Main St., E. (3rd floor)
St. Joseph, Mo.—216 N. 7th (Arcade Bldg.)
St. Louis—515 Arcade Bldg. (opp. P. O.)
St. Paul—43 E. 5th St. (Frederic Hotel)
St. Petersburg—W. L. Tillinghast
Sacramento—219 Ochsner Bldg., K near 7th
Saginaw—Goeschel-Kuiper Co.
Salt Lake City—Walker Bros. Co.
San Diego—The Marston Co.
San Francisco—127 Stockton St.
San Jose—Hoff & Kayser
Schenectady—445 State St.
Scranton—Lewis & Reilly
Seattle—Baxter & Baxter
Sioux City—The Pelletier Co.
Spokane—The Crescent
Springfield, Mass.—Forbes & Wallace
Stamford—L. Spelke & Son
Syracuse—121 West Jefferson St.
Tacoma—255 So. 11th St. (Fidelity Bldg.)
Toledo—LaSalle & Koch Co.
Toronto—7 Queen St. East (at Yonge)
Trenton—H. M. Voorhees & Bro.
Troy—15 Third St. (2nd floor)
Tulsa—Lyon's Shoe Store
Utica—28 & 30 Blandina St., cor. Union
Vancouver—Hudson's Bay Co.
Washington, D. C.—1319 F Street (2nd floor)
Wheeling—Geo. R. Taylor Co.
White Plains—Gedney Boot Shop
Wilmington, Del.—Kennard-Pyle Co.
Winnipeg—Hudson's Bay Co.
Worcester—J. C. MacInnes Co.
Yonkers—22 Main St.
Youngstown—B. McManus Co.

Agencies in 446 other cities

WILLYS OVERLAND FINE MOTOR CARS

More people are talking about this Fine Car than any other Car in America

From the very first, thousands of far-seeing motorists predicted that the new Overland Six would be the outstanding automobile of the year. It was the unrivaled hit of all the Automobile Shows—the great favorite of the crowds—and its success has grown to proportions never before attained by any other automobile in comparable time. ¶ People who know automobiles unhesitatingly call the new Overland Six an engineering masterpiece. It is beautifully designed ... wonderfully balanced ... beautifully built ... beautifully finished and a brilliant performer on the open road, in traffic, on hills. ¶ It gives you hair-trigger action when you touch the throttle. It gives you speed ... and smoothness ... and economy you'd never expect with six-cylinder performance. Reclined seats and long flexible springs give delightful riding comfort. A demonstration *is a revelation!* Don't fail to see the new Overland Six! Willys-Overland, Inc., Toledo, Ohio—Willys-Overland Sales Co., Ltd., Toronto, Canada.

The Fine

New OVERLAND

With SIX *Cylinders*

STANDARD SEDAN, $985; DE LUXE SEDAN, $1150, F. O. B. TOLEDO

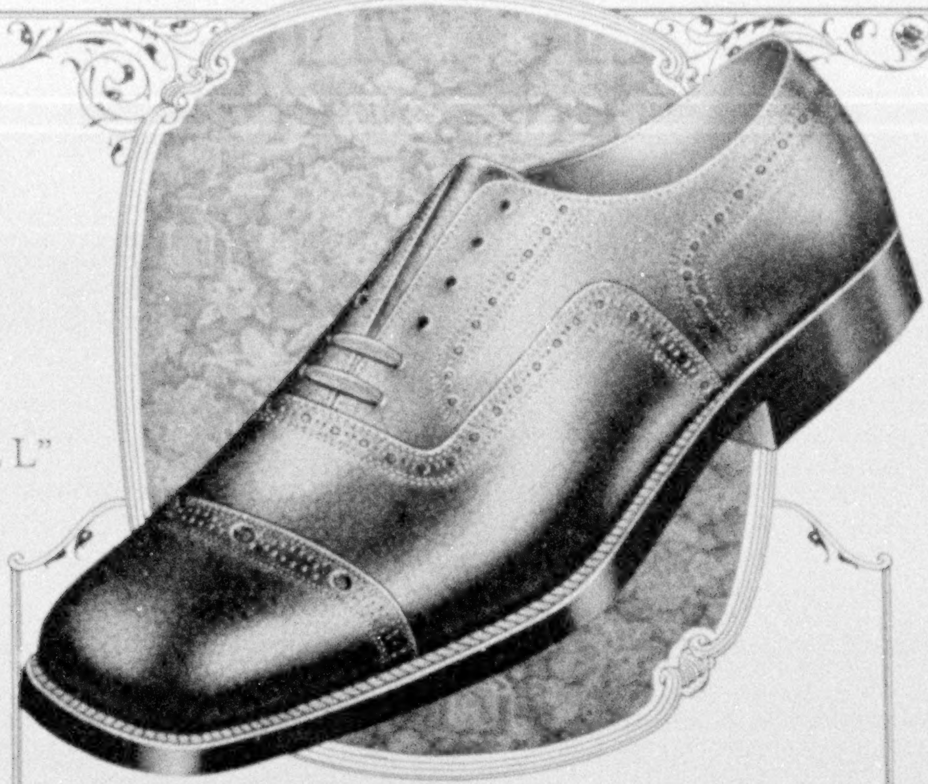
XUM

Take a Kodak with you

Autographic Kodaks $6.50 up

Eastman Kodak Company, Rochester, N. Y., *The Kodak City*

FROM THE HOUSE OF BANISTER



The "NOBEL"

Worthy of the climb and the crest!

Look at the feet of men who have climbed near to the top of the unseen ladder of success.

So many of them wear Banister Shoes you might easily make the mistake of thinking the shoes themselves carried them up. It is not so.

But for eighty years, men with the courage, ability and judgment to grasp and hold the best things in life have naturally chosen these shoes as the most fitting (in both senses) for them. Such men demand comfort as their right—insist on fine appearance as their privilege.

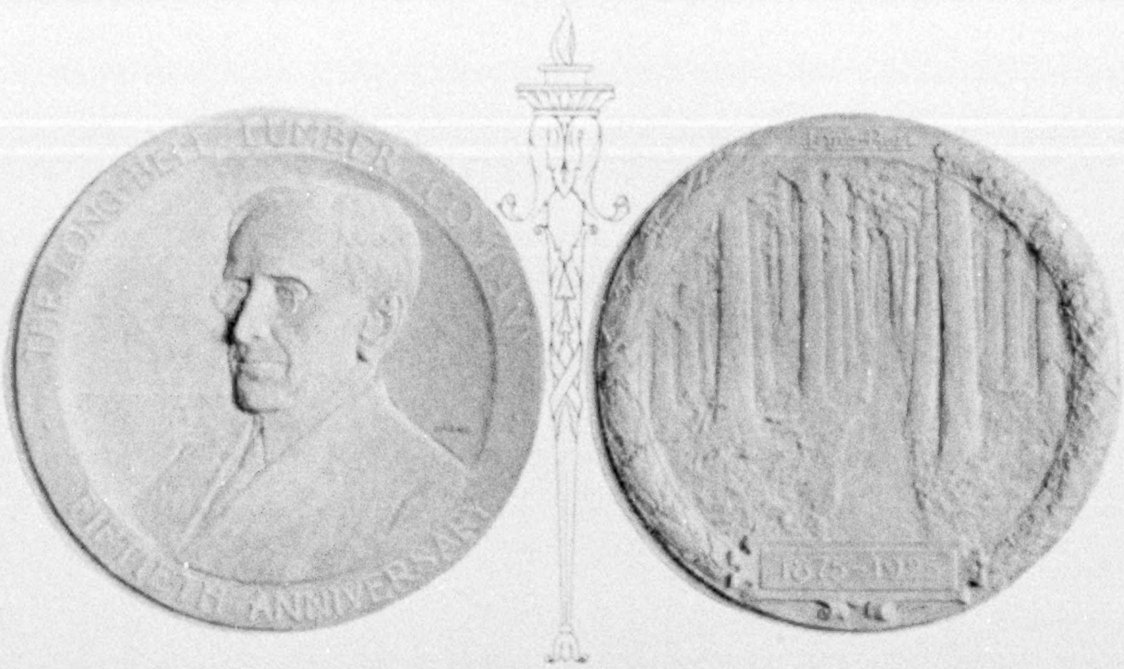
Drop us a line and we'll tell you of a Banister dealer near you.

JAMES A. BANISTER CO.
NEWARK, NEW JERSEY

BANISTER
Shoes

SINCE 1845 THE CHOICE OF GENTLEMEN

XUM



LUMBERMEN SINCE 1875

THE Long-Bell Lumber Company began business April 30, 1875, with a single retail lumber yard—fifty years ago. Today its mills in the South, the West and Pacific Northwest share responsibility in helping to shelter a nation and in meeting the requirements of an ever-expanding industrial development. *Since 1875*—each milestone a pride-mark of Time, setting its own standard for the future.

THE LONG-BELL LUMBER COMPANY

R. A. LONG BUILDING KANSAS CITY, MO.

Pittsburgh *Proof* Products

Glass
Paint - Varnish
Brushes

"Guide to Better Homes" sent you free. Equal in information to any five dollar book on home furnishing and decoration. Write Dept. C, today.

"THE Store with personality"—that's what New Yorkers say who know the Saks & Company Department Store, one of the city's most modern institutions—and in a large measure this store's attractiveness is due to light-diffusing, soft-toned walls that show no laps or brush marks. They were painted with

Velumina

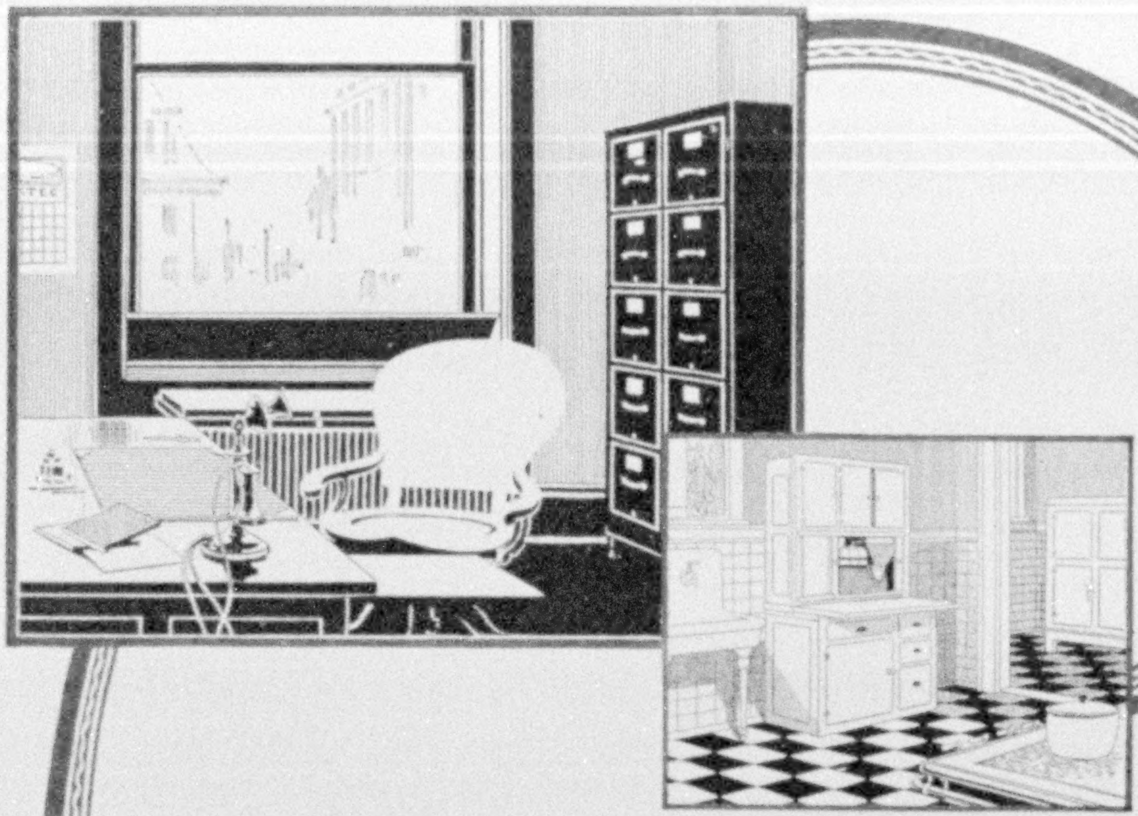
Washable Wall Paint

which gives walls soft tones that lend spaciousness to interiors and a smooth, *poreless* coating which dirt and grime cannot penetrate, permitting easy sponging to take the place of redecorating. Seventeen colors for homes, business buildings, churches, hospitals, etc.

Whatever you need—Glass, Paint, Varnish or Brushes—the Pittsburgh Plate Glass Company has a product that exactly fills your requirements. Sold by quality dealers; used by exacting painters.

PITTSBURGH PLATE GLASS CO.

Paint and Varnish Factories .... Milwaukee, Wis., Newark, N.J., Portland, Ore.



For Office and Home, Use Sheet Steel Furniture and Equipment

STRENGTH and durability, economy of space, fire protection, sanitary cleanliness, handsome appearance—these are the requirements for modern office furniture and equipment. And you get all of these values from such equipment when it is made of sheet steel.

Steel desks, tables, filing and safe cabinets, lockers, partitions and shelving, insure safety, economy, long life. They take up less space in proportion to their capacity. There are no cracks or crevices for lodgment of dust and dirt. They can be kept always clean, merely by passing a damp cloth over them. And you can now get them in a wide variety of beautiful designs and color effects.

For the same reasons, steel bedroom furniture and kitchen and refrigerating equipment are rapidly becoming the first choice of interior decorators and domestic science authorities. For wall paneling in kitchens and bathrooms, sheet steel is excellent. It is fire-resisting—cannot crack. Is water and stainproof and can always be kept immaculate with ease.

Ask for the booklet, "The Service of Sheet Steel to the Public." It will show you many ways that probably have never occurred to you in which sheet steel and its products can serve and save for you.

SHEET STEEL
TRADE EXTENSION COMMITTEE
715 OLIVER BUILDING
PITTSBURGH PENNSYLVANIA

It's the film on your teeth that makes them ugly

Run your tongue across your teeth and you can feel it. Make those cloudy teeth glisten. Begin today *this new way.*

EVERYWHERE are whiter teeth, teeth that gleam and sparkle.

This offers you free a 10-day test of the way that brings them. Simply mail the coupon.

What you find will surprise you. Your teeth are covered with a dingy film that ordinary methods do not combat successfully. Under it are the prettier, whiter teeth that you envy.

The great enemy of teeth

Film is the great enemy of tooth beauty. And a chief cause, according to world's dental authorities, of most tooth troubles. It clings to teeth, gets into crevices and stays. Germs by the millions breed in it. They, with tartar, are the chief cause of pyorrhea.

You can't have prettier, whiter teeth; you can't have healthier teeth unless you combat that film.

Mail the coupon. Or ask your druggist for Pepsodent. Don't expect the same results from old-time dentifrices. Start beautifying your teeth today.

Pepsodent REG. U.S. PAT. OFF.

The New-Day Quality Dentifrice

Endorsed by
World's Dental Authority

FREE—Mail this for 10-Day Tube

THE PEPSODENT COMPANY,
Dept. 610, 1104 S. Wabash Avenue
Chicago, Ill., U. S. A.
Send to

Name..............................

Address..............................

Only one tube to a family 1770

XUM

Seeger

Original Siphon Refrigerators

are generally accepted as the

Standard of the American Home

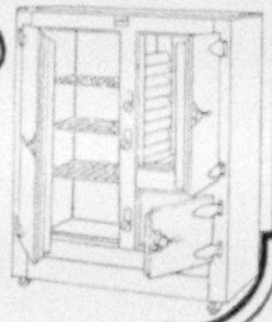
As good a refrigerator as the Seeger is worthy of electrical refrigeration.

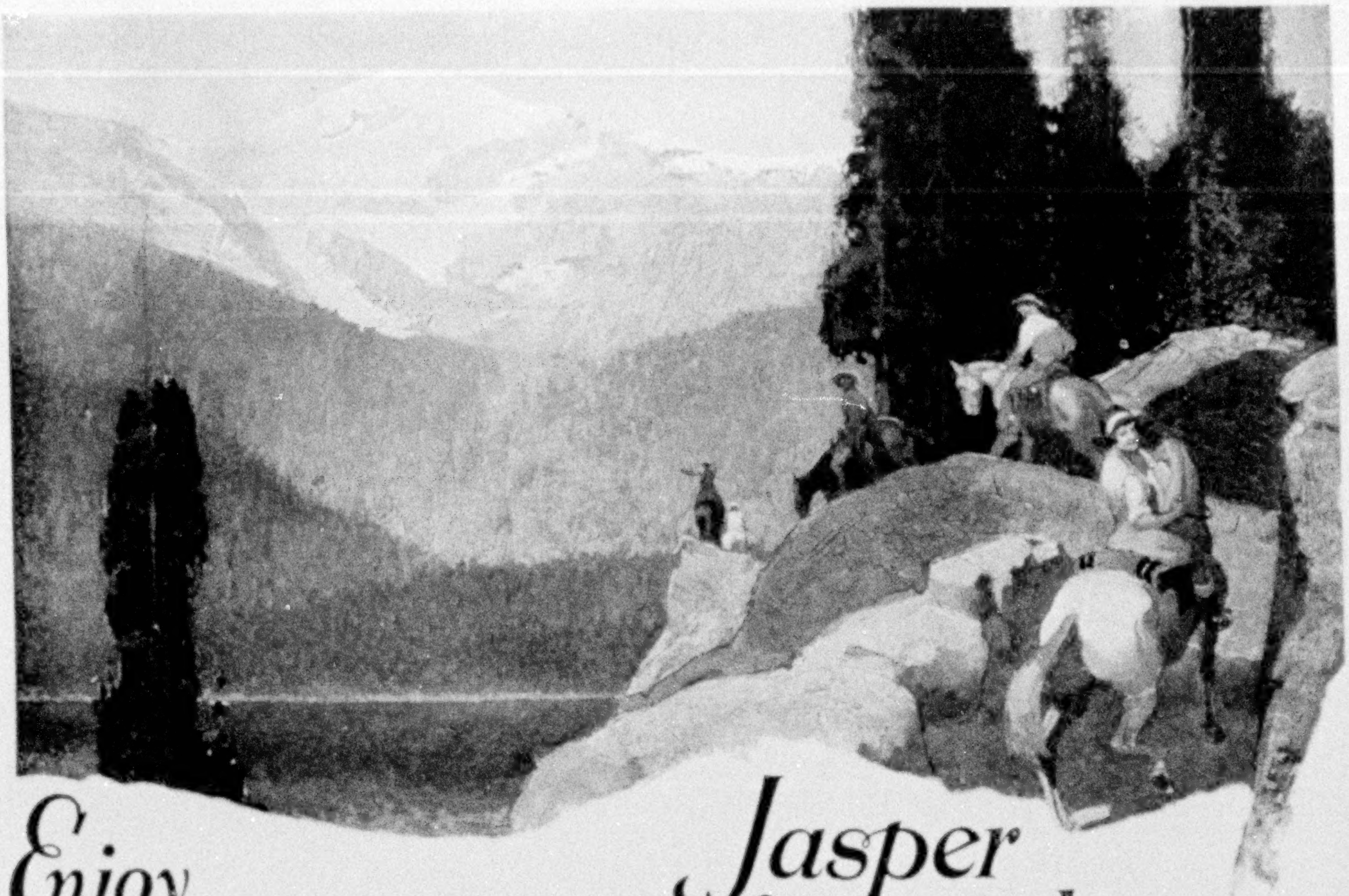
Equally efficient with ice.

Representative Dealers in all Cities

SEEGER REFRIGERATOR CO.

SAINT PAUL   NEW YORK   BOSTON
CHICAGO   LOS ANGELES





Enjoy a mountain holiday at Jasper National Park in the heart of the Canadian Rockies

Special round trip Tourist Fares to Jasper National Park

$64.25 from Chicago

$123.65 from Boston

•

$115.31 from New York

•

$84.00 from San Francisco

A NEW vacation land is calling! A new and greater summer playground offers you its treasures of incomparable beauty. Jasper National Park [4,400 square miles] offers opportunity for open-air enjoyment, made accessible by Canadian National Railways. Here Mt. Edith Cavell rises to snowy heights and Maligne Canyon reveals its unique rock formations.

Stop at Jasper Park Lodge, where superior accommodation is provided for 350 guests [Rates $6.00 and up, American Plan. Open May 15th to Sept. 30th]. Here is summer recreation in infinite variety. You may climb [with Swiss guides, if you wish], ride, swim, golf, play tennis, or rest.

Then take the Triangle Tour of British Columbia—by rail from Jasper National Park down the valley of the mystic Skeena to Prince Rupert. Thence by steamer through 550 miles of sheltered scenic seas to Vancouver, returning to Jasper National Park along the roaring gorges of the Fraser and Thompson rivers.

New Alaska Service

You may board a palatial "Canadian National" steamer at Vancouver, and voyage in luxurious comfort to Alaska. Returning, disembark at Prince Rupert or Vancouver, as you prefer, and proceed by rail to Jasper National Park, traveling in the midst of majestic mountain beauty.

Write to nearest office for tourist fares, resort rates and booklets.

Offices:

Boston
333 Washington St.
Buffalo
11 So. Division St.
Chicago
108 W. Adams St.
Cincinnati
406 Traction Building
Cleveland
948 Union Trust Building
Detroit
1259 Griswold St.
Duluth
430 W. Superior St.
Kansas City
334-335 Railway Exchange Bldg.
Los Angeles
503 So. Spring Street
Minneapolis
518 Second Ave. South
New York
1270 B'way., cor. 33rd St.
Philadelphia
Franklin Trust Bldg. 1500 Chestnut St.
Pittsburgh
505 Park Bldg.
Portland, Me.
Grand Trunk Railway Sta.
Portland, Ore.
122 Third St.
St. Louis
305 Merchants Laclede Bldg.
St. Paul
328 Jackson St.
San Francisco
689 Market St.
Seattle
902 Second Ave

CANADIAN NATIONAL RAILWAYS

THE • LARGEST • RAILWAY • SYSTEM • IN • AMERICA

The best stories are never written

HOW many times have you said, "This would make a wonderful short story"? But you didn't write it, and the inspiration was soon forgotten.

"Many a story banged off hot on my Corona in a front-line dugout would never have been written if I had waited to reach a spot of greater convenience."—*Louis R. Freeman, War Correspondent, Explorer, Traveler.*

* * * *

The advantage of owning a Portable Corona is that you can write your best thoughts as they come to you, anywhere, any time—and that's the secret of successful writing! The newest Corona (Model Four) has the standard keyboard used in offices everywhere.

Corona Four costs only $60. Easy terms if desired. Look for Corona in your phone book or write Corona Typewriter Co., Inc., 169 Main St., Groton, N. Y.

CORONA

© E.C.P.CO.'25

Crane's Cordlinear

That elusive thing called charm has surely been caught and embodied in this new, smart Crane creation.

Its novel cord effects, broken by self-tone vertical lines, give depth and richness to the paper without affecting its pleasing writing qualities.

There are four dainty colors to choose from and many new paper folds and envelope shapes.

You will find Crane's Cordlinear, as well as other Crane's writing papers, such as

Crane's Linen Lawn and *Crane's Kid Finish*

AT ALL STORES WHERE GOOD STATIONERY IS SOLD

EATON, CRANE & PIKE CO. 225 FIFTH AVE., NEW YORK

Another wonderland for Alice

In search of new adventures Alice stepped through the magnifying glass and found herself in the wonderland of telephone making.

Here at the great telephone factory things were coming to life. Little things that she never could see before. Little distances like one one-thousandth part of an inch, that she didn't know were worth bothering about, now became immensely big and proud and important.

And why not? These little bits of things are treated with such great respect and care at the telephone factory.

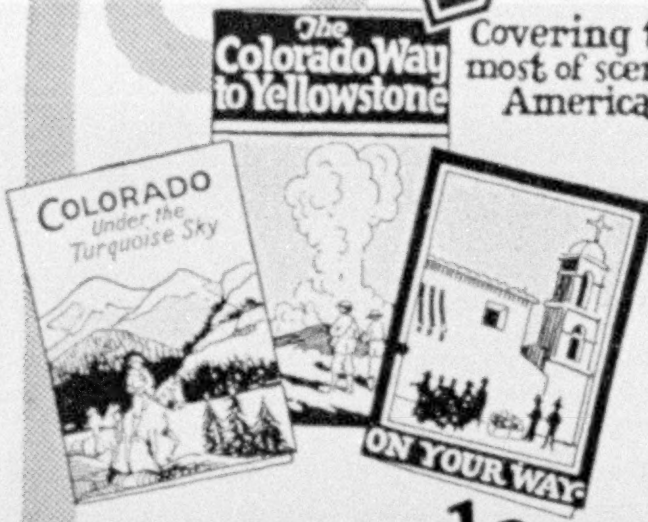
And that is why your Western Electric telephone is made so well and lasts so long.

Western Electric

SINCE 1869 MAKERS OF ELECTRICAL EQUIPMENT

One tour Rock Island

Covering the most of scenic America



Colorado Yellowstone California

Few of us can see *all* of our country's scenic beauties, but, by careful planning, it is possible to visit the most famous.

Rock Island Lines so reach across our Western Vacation Region that an almost unlimited number of tours, affording the widest possible range, are available at a remarkable saving of time and funds.

Step on the luxurious Rocky Mountain Limited at Chicago; step off in the Rocky Mountains unlimited, the first step on your Colorado way to Yellowstone. Rock Island is also the route of the all-Pullman Golden State Limited to and from California. See Old Mexico on your way.

Go one way; return another. Stop over anywhere.

Let our travel experts help you in your planning. Rock Island Travel Bureaus in all principal cities. Check the book or books you wish.

Mail the Coupon Today!

Mr. L. M. Allen, V. P. & P. T. M. Rock Island Lines
742 La Salle Station, Chicago

Please mail me, without charge, your publication on
☐ California ☐ Colorado ☐ Yellowstone

Check the book or books you desire.

how simple

Just sprinkle a little Sani-Flush into the toilet bowl—follow directions on the can—flush. The job is done—and done thoroughly. What could be easier? No scrubbing. No hard work.

Sani-Flush removes every mark, stain and incrustation. It makes the toilet bowl sparkle.

Gets down in the trap. Destroys foul odors. Harmless to plumbing connections. Keep a can handy in the bathroom.

Buy Sani-Flush at your grocery, drug or hardware store, or send 25c for a full-size can.

Sani-Flush

Reg. U.S. Pat. Off.

Cleans Closet Bowls Without Scouring

The Hygienic Products Co., Canton, Ohio

Myers "Self-Oiling" Electric Water Systems —for Summer Cottages

Increased comfort and pleasure for your family—and increased income from your cottage or home when you rent it! The Myers Self-Oiling Electric Water System for shallow or deep service makes the summer cottage, hotel or country home equal to city homes in comfort and convenience.

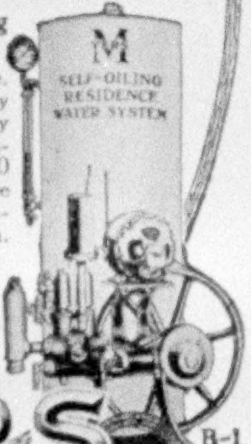
Service wires or private power and lighting plants provide current to operate Myers Self-Oiling Water Systems. Automatically controlled, maximum economy in power is insured.

Self-Starting—Self-Stopping and Self-Oiling

Simple, safe, silent, trouble-free. There is a style and size for every need, including equally satisfactory outfits for hand, wind or gas engine operation. Capacities: 200 to 10,000 gallons per hour. See your dealer today. Write us direct for catalog and information.

THE F. E. MYERS & BRO. CO.
105 Orange St., Ashland, Ohio

Manufacturers for more than fifty years of Myers Pumps for Every Purpose. Hay Tools and Door Hangers.



MYERS

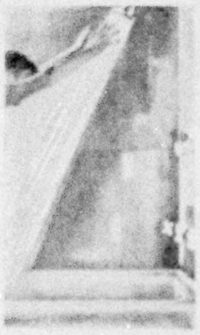
B-1

"Be out in a couple minutes, old man,
—just going to take a shower."

BUT if he had said: "I'm going to take a bath," that would have meant that the other fellow, unless he had considerable time to wait, would have gone to the office *bathless*.

Time required is only one difference between a "bath" and a "shower". With a shower you also have the advantage of bathing in clean, fresh water, the temperature of which is under your instant control.

The ideal shower control is through the Mixometer,—a SPEAKMAN product made by a company which for more than half a century has been identified with the plumbing industry. For the last twenty-five years the Speakman Company has specialized in showers for residences, institutions, clubs, Y. M. C. A.'s and hotels.



H-2370. The ideal combination of shower and bath fixture.

Your plumber and architect know SPEAKMAN showers, also SPEAKMAN bath and lavatory fixtures. We will be glad to work with both of them in seeing that you get just the right shower and fixture suited to your bath room—and income. We have shower folders and other literature relating to the bath room which you will find interesting. It will be forwarded promptly upon your request.

SPEAKMAN COMPANY, Wilmington, Delaware

SPEAKMAN SHOWERS

THE MODERN BATH ROOM HAS A SHOWER

INSURE your baggage whenever and wherever you travel.

North America Tourist Baggage Insurance protects you against theft, fire and other hazards en route or in hotels.

Ask any Insurance Agent or mail the attached coupon for further information.

Insurance Company of North America
PHILADELPHIA

"The Oldest American Fire and Marine Insurance Company"

Founded 1792

Insurance Company of North America
Third and Walnut Streets
Philadelphia, Pa., Dept. G G 5

Name ....

Street ....

City .... State ....

Wants information on Tourist Baggage Insurance

This coupon will bring you FREE of charge our booklet

"How to See Europe at Moderate Cost"

DON'T fail to see it before you decide on your European trip. Gates Tours are planned and managed by skilled experts with over 30 years of successful experience.

Mail this Coupon today!

GATES TOURS—Dept. A-5,
225 Fifth Ave., New York

New and Unique Way to

YELLOW STONE

See the grandest vistas in all the world — the last old West. The Wind River, Shoshone Indian reservations, the mighty Tetons, grandest of the Rockies; Jackson Hole. The biggest game retreat. Unrivalled trout fishing.

Comfortable Dude Ranches — modern hotels. Travel by motor cars or on horseback over mountain trails.

It's the greatest Western trip. *Low fares.*

Free booklets on request.

C. A. CAIRNS
Passenger Traffic Manager
C. & N. W. Ry.
226 West Jackson Street
Chicago, Ill.

Come *this* Summer

to

Rhode Island's Cool Ocean Shore!

Watch Hill, Weekapaug and Pleasant View, in famous old South County, in the Town of Westerly, R. I.

"One of the Loveliest Bits of American Landscape"

COTTAGES to rent from beach to hilltop from the simpler bungalow at $350 to the elaborate villa at $6000. Hotels modern but homelike. Some lovely old country houses that artists would appreciate.

YOU can have a quiet, relaxing summer enjoying this beautiful uncrowded countryside and surf-beaten coast, or revel in the thrill of outdoor sports in a mellow climate—sea bathing that's not too cold, golf, sailing, tennis, motoring—and a round of charming social amenities.

VISIT this country. You will love the softness in the air, spaciousness of the view—"a blend of ocean blue and little green ponds, of far horizon and beach-plum bush, of wild sea and little gray farmhouse which is captivating and unforgettable." It is ideal for summer home, accessible to all conveniences and amusements of modern life, yet close to the primitive aspects of Nature in sea and forest.

Come see this land. Send for illustrated folder.

CHAMBER *of* COMMERCE WESTERLY, R. I.

WIND–the "fifth" horseman

Famine, Pestilence, War, Death . . the famed Four Horsemen . . YET—none more ruthless than unleashed WIND! . . Charging down from Nowhere . . brushing aside the stoutest buildings . . trampling out lives by scores and hundreds. . . WIND—the "fifth" horseman.

NO precaution of man avails to avoid the destructive fury of windstorms and tornadoes.

Though you may not own your house, wisdom dictates that you insure your personal belongings against the "fifth" horseman. A roof only partly lifted by wind can expose you to heavy loss through damage to furniture, rugs, clothing, etc.

Let our representative explain a policy that has been well-termed "the twin brother of fire insurance."

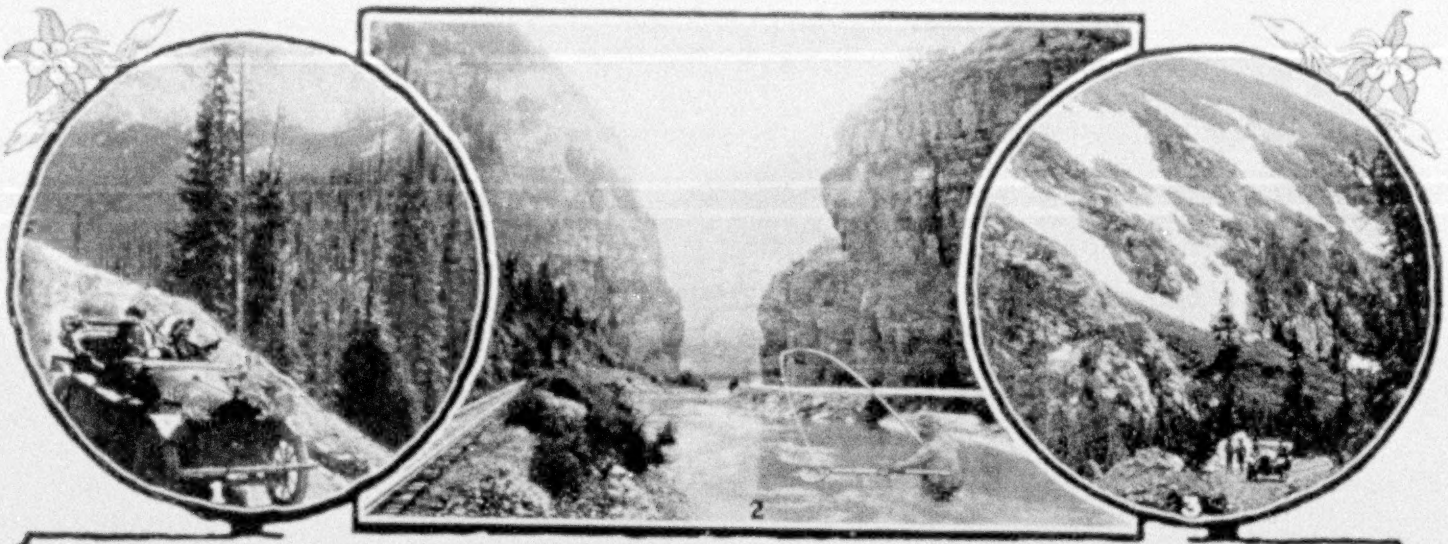
Affiliated with The Automobile Insurance Co., of Hartford, Connecticut, are the Ætna Life Insurance Co., the Ætna Casualty and Surety Co. and the Standard Fire Insurance Co. These four companies issue virtually every known form of policy—Life Insurance in all its branches; Group Life; Group Disability; Accident and Health; Automobile; Compensation; Liability; Burglary; Plate Glass; Water Damage; Fire; Marine; Transportation; Fidelity Bonds; Surety Bonds, etc. Insure according to your needs—as you prosper and as your obligations increase.

EVERY representative of The Automobile Insurance Company, of Hartford, Connecticut, is a man worth knowing. His company is a unit of the strongest multiple-line insurance organization in the world. He is able to provide you with unsurpassed security for *all* your insurable interests.

Get acquainted with our representative in your community today! His sound insurance advice may save you thousands of dollars, and avoid costly mistakes.

THE AUTOMOBILE INSURANCE COMPANY, OF HARTFORD, CONNECTICUT

AFFILIATED WITH ÆTNA LIFE INSURANCE COMPANY—ÆTNA CASUALTY AND SURETY COMPANY—STANDARD FIRE INSURANCE COMPANY



1--Berthoud Pass, Continental Divide. 2--Echo Cliffs, Colorado River. 3--Fall River Road, Rocky Mountain National Park

Bring Your Family to Cool, Colorado

Very low summer fares to Denver on all railroads

Hundreds of business and professional men from all parts of the United States maintain summer homes in Colorado for their families and enjoy regular month-end trips themselves. Your family will be happier and enjoy better health after a few weeks' recreation--away from the heat and worry of the city. Hotels, Resorts and cozy cottages, at prices to fit any purse.

OUR COLORADO VACATION BOOKLET tells you about Rocky Mountain National Park, Mesa Verde National Park, Denver's Mountain Parks, Glaciers, National Forests and 60 other rail and auto trips from Denver. Write

Make Colorado your summer vacation-destination

610 Hartford Bldg., CHICAGO, ILL. TOURIST and PUBLICITY BUREAU, Denver Chamber of Commerce 514 Seventeenth St., DENVER, COLO.

Look Inside the Piano for this Trade-Mark

WESSELL, NICKEL & GROSS NEW YORK TRADE MARK

The Sign of the World's Standard Piano Action

A Quality Action Means A Quality Piano

THE most vital part of *any* piano is the piano action. Upon it depend the control of tone and touch and, in a large measure, the durability of the instrument.

Your purchase of a piano, player or reproducing piano will bring lasting satisfaction if you insist upon the Wessell, Nickel & Gross piano action. For you will find this famous action only in instruments of established worth.

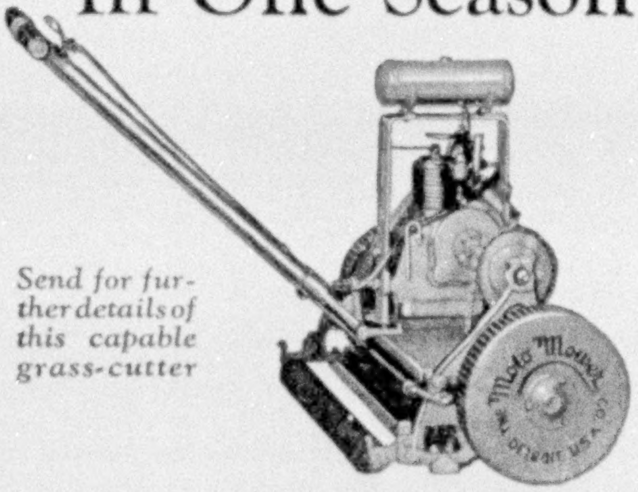
The Wessell, Nickel & Gross piano action is built by the oldest, the largest and the foremost maker of piano actions in the world. *It is the highest-priced action built today.* Look for the octagonal trade-mark (shown above), which identifies the Wessell, Nickel & Gross equipped instrument.

WESSELL, NICKEL & GROSS
Established 1874 New York City

When you Buy an Upright, Grand, Player or Reproducing Piano— Insist on the Wessell, Nickel & Gross Piano Action

Repays Its Cost In One Season

Send for further details of this capable grass-cutter



Owners of large estates tell us that Moto-Mower saves its cost in a single season. Fast, powerful and economical, Moto-Mower cuts as much grass per day as five men with hand-mowers. Runs close to flower-beds, trees, hedges, thus eliminating hand trimming. Easily operated by rubber handle-grips, it requires little mechanical attention. A practical investment for city or country homes.

THE MOTO-MOWER CO.
3244 E. Woodbridge St. Detroit, Mich.

Since 1839
RUSSWIN
RUSSELL & ERWIN
DISTINCTIVE
HARDWARE
For the Bungalow – the Pretentious Home – the Monumental Structure –
THE superior judgment which is responsible for the finest dwellings and business structures expresses itself in part through the selection of Russwin Hardware as the finishing touch of distinctiveness — in which, as well, is assurance of that sturdy quality which makes for enduring service.
Russell & Erwin Manufacturing Co.
New Britain, Connecticut
"To Russwin-ize is to Economize – the Economy of the Best"
TIMES BUILDING
New York, N. Y.
Architects — Ludlow & Peabody
Contractor — George A. Fuller Co.
W. O. JENKINS
Los Angeles, Cal.

Genuine Porcelain Enamel Inside and Outside

BOHN
SYPHON REFRIGERATOR

CORRECT in its principle of syphon refrigeration—Its cleanliness emphasized in beautiful crystal-white porcelain enamel walls (inside and out), this new BOHN will find its way into the hearts and homes of discerning housewives. ℭAdopted by the Pullman Company; every dining car on all railroads is equipped with BOHN SYPHON REFRIGERATORS and is a rolling testimonial of unsurpassed efficiency.

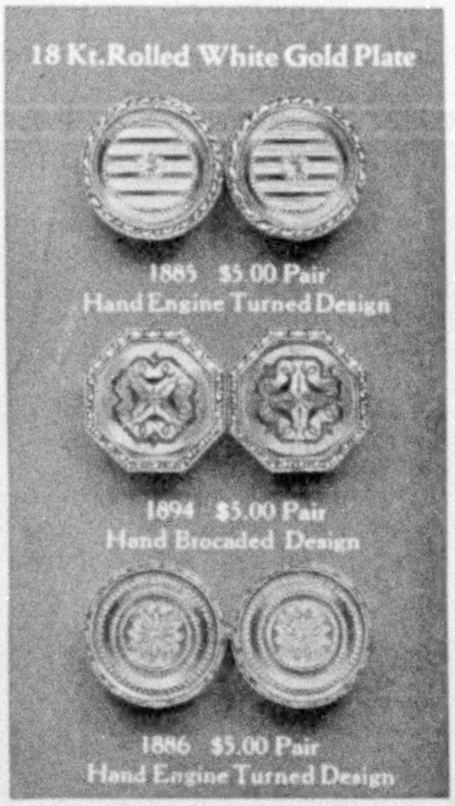
BOHN
REFRIGERATOR
COMPANY

Saint Paul, Minnesota

Retail Salesrooms in the following cities:

New York—5 East 46th Street
Boston—246 Boylston Street
Chicago—Washington Street and Garland Court

CORRECT JEWELRY FOR GENTLEMEN



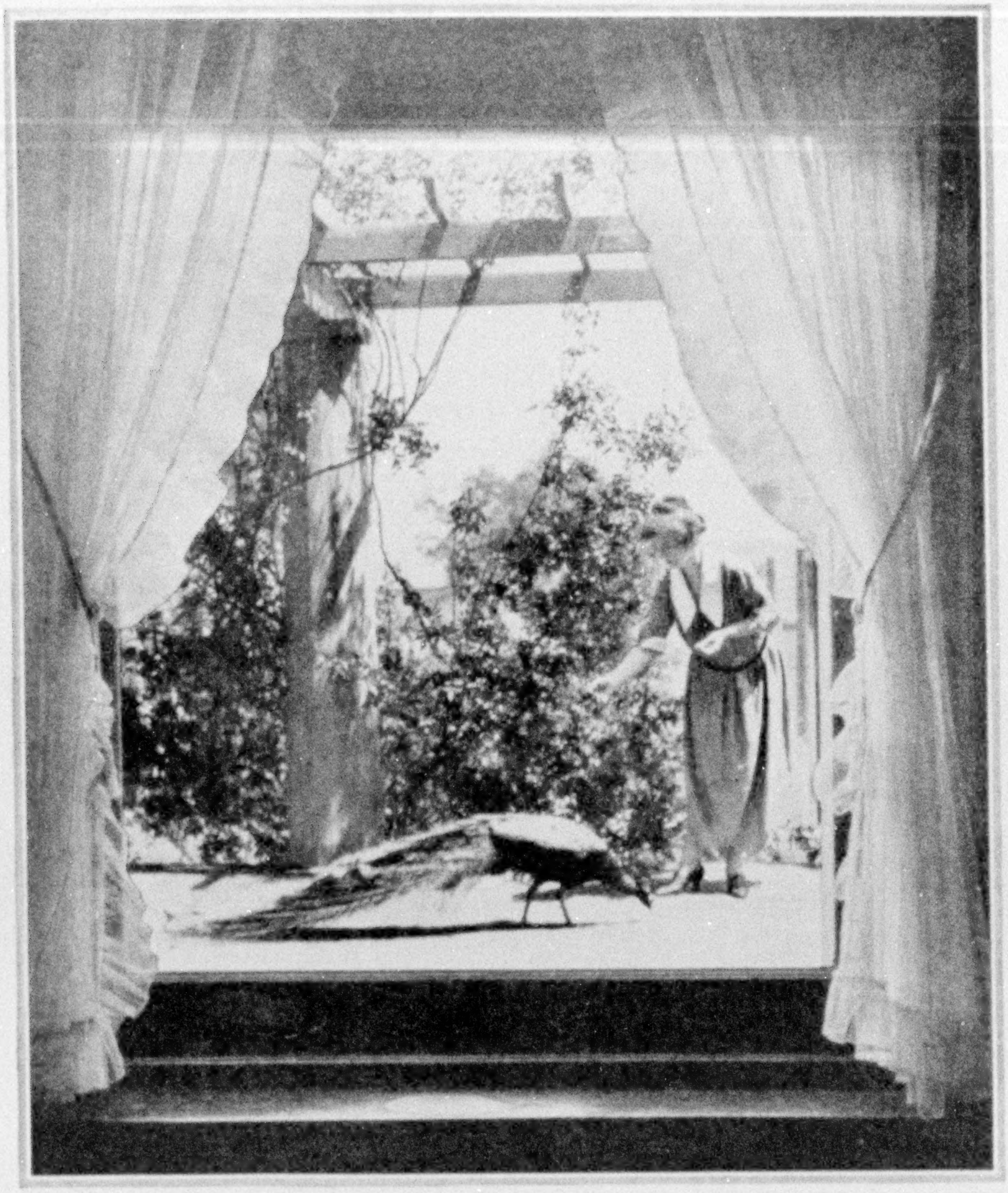
Why you should wear Krementz links!

The designs are pleasing and in the latest style; the workmanship is the finest known to the jeweler's art; the quality permits them to be guaranteed to wear a lifetime or replacement free.

Look for the name Krementz on the back of each. Behind it is 59 years of designing and making fine jewelry. Any good jeweler will tell you when you buy Krementz jewelry you are assured of superior quality.

Buy these links to wear, to give as gifts. You may see them at the better shops. Write us for the names of dealers nearest you.

Krementz
COLLAR BUTTON
Newark New Jersey



A window frame is a picture frame

A WINDOW frames thousands of changing pictures—the intimate charm of a garden, the vista of a curving road, the first faint flush of green in the spring. Plan that your client may view the pageant of the seasons through the perfect clarity of Plate Glass. The surfaces of Plate Glass are flat, parallel and polished. They present no obstruction to the eye. The wavy distortions of ordinary window glass are notably absent in Plate Glass. Viewed from the outside, Plate Glass enhances the appearance of any house. Its brilliant surface is quickly and easily cleaned. It adds beauty and distinction wherever used.

Use PLATE Glass

Nothing Else is Like it

To glaze a house, large or small, with Plate Glass costs less than one per cent of the total cost of the house, and it invariably pays for itself in increased selling or renting value. Specify Plate Glass. Your architect will give you comparative figures.

PLATE GLASS MANUFACTURERS *of* AMERICA

XUM

Sheltered Feeding Station

Attracts early birds. Operates like a weathervane. Always dry. Green, of pine. With 8-foot pole, shelter 24 x 22 x 12 inches $8.50

Scientific Wren House

It brings the wrens! 4-compartment house for succeeding broods. Beautiful to hang. Green. Oak with cypress shingles. 28 in. high, 18 in. diameter . . . $7.00

Don't Miss the Greatest Delight of the Spring!

DID you ever put up a Dodson bird house . . . 'tho chill winds still blew? And then, heigh-ho, some morning . . . the martins, the wrens, the other song birds arrive. Give them a perfect home! You watch them raise successive broods of songsters, destined to *work* merrily all summer, ridding garden and trees of costly insect pests . . . they pay, these Dodson signs of hospitality. Send us your order from this page. Or write to Mr. Dodson.

Ask us about Dodson's Famous Sparrow Trap $8.00

JOSEPH H. DODSON, Inc.
702 Harrison Ave., Kankakee, Ill.

Mr. Dodson is President of the American Audubon Association and Devoted Friend of the Song Birds

REAL DODSON BIRD HOUSES SOLD ONLY *from* KANKAKEE

Queen Anne
Martin House

48 rooms for the beautiful martins who colonize. Scientific porch. White, green trims. Of pine, copper roof, 22-foot pole 36 x 26 x 37 inches . . . $60.00

Free! Send for Mr. Dodson's fascinating booklet—"*Your Bird Friends and How to Win Them*," which is also a complete catalogue of his houses, etc. Things you should know about the work of the song birds!

Greater Mowing Economy With the New Ideal

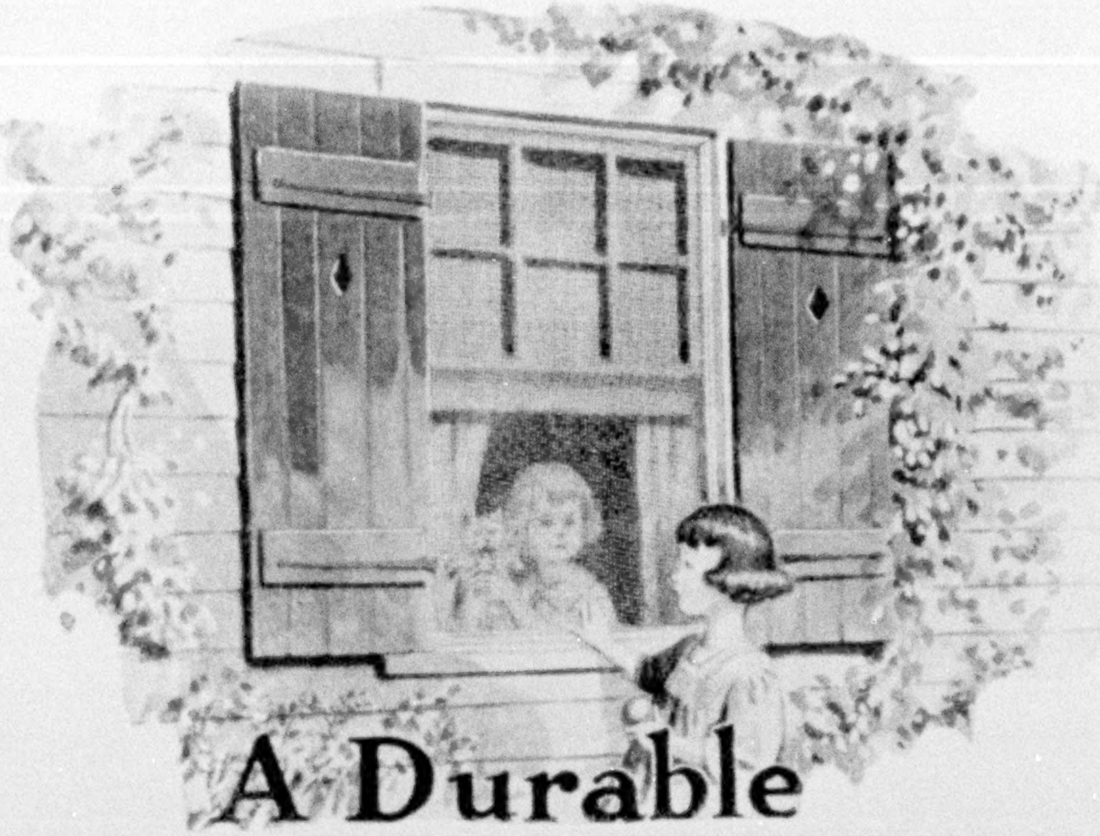
IN THIS—the *new* model Ideal—is offered new mechanical features that mean added years of service, easier operation, less up-keep and greater satisfaction. In short, the reliable Ideal upon which leadership was built has been made a *still better Ideal.*

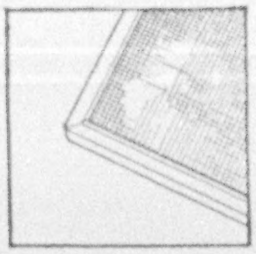
It is a labor and money saver—certainly; but more important still it is a practical, long lived, trouble-free machine. It does the work of five or more men with hand mowers and rolls as it cuts. It builds a fine, well kept, smooth lawn at a nominal cost.

Ask your nearest Ideal dealer, or write us for a copy of our latest catalog describing this *new* Ideal.

Ideal Power Lawn Mower Co.
R. E. Olds, Chairman
422 Kalamazoo St., Lansing, Michigan
New York, 13-19 Hudson St. Chicago, 11 E. Harrison St.
Dealers in all Principal Cities

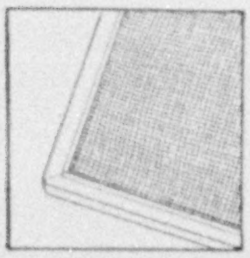
IDEAL
Power Lawn Mowers





Strands corrode in alloyed screen cloth.

Iron and steel cloth rusts out in patches.



Ordinary copper screen cloth is very pliant.

A Durable Screen Cloth

If you need to renew the cloth in your screens this spring, buy Jersey Copper Screen Cloth. It will save you money in the long run because of its great durability.

Copper screen cloth cannot rust, and Jersey is copper 99.8% pure. Furthermore, Jersey has a decided advantage over ordinary copper cloth. The wire used in weaving it is made by a special Roebling process, which gives it stiffness and tensile strength comparable to steel.

Jersey Copper Screen Cloth, *16 mesh*, is a true *insect* screen cloth. It keeps out mosquitoes and other small insects as well as flies.

Jersey is made in either bright or dark finish, but we recommend the latter. It does not go through any weathering process. It is as nearly invisible as a screen cloth can be and stays that way.

If you cannot obtain Jersey Copper Insect Screen Cloth in your locality, write us. We will tell you where you can get it and send you a booklet, "A Matter of Health and Comfort", which you will find worth reading.

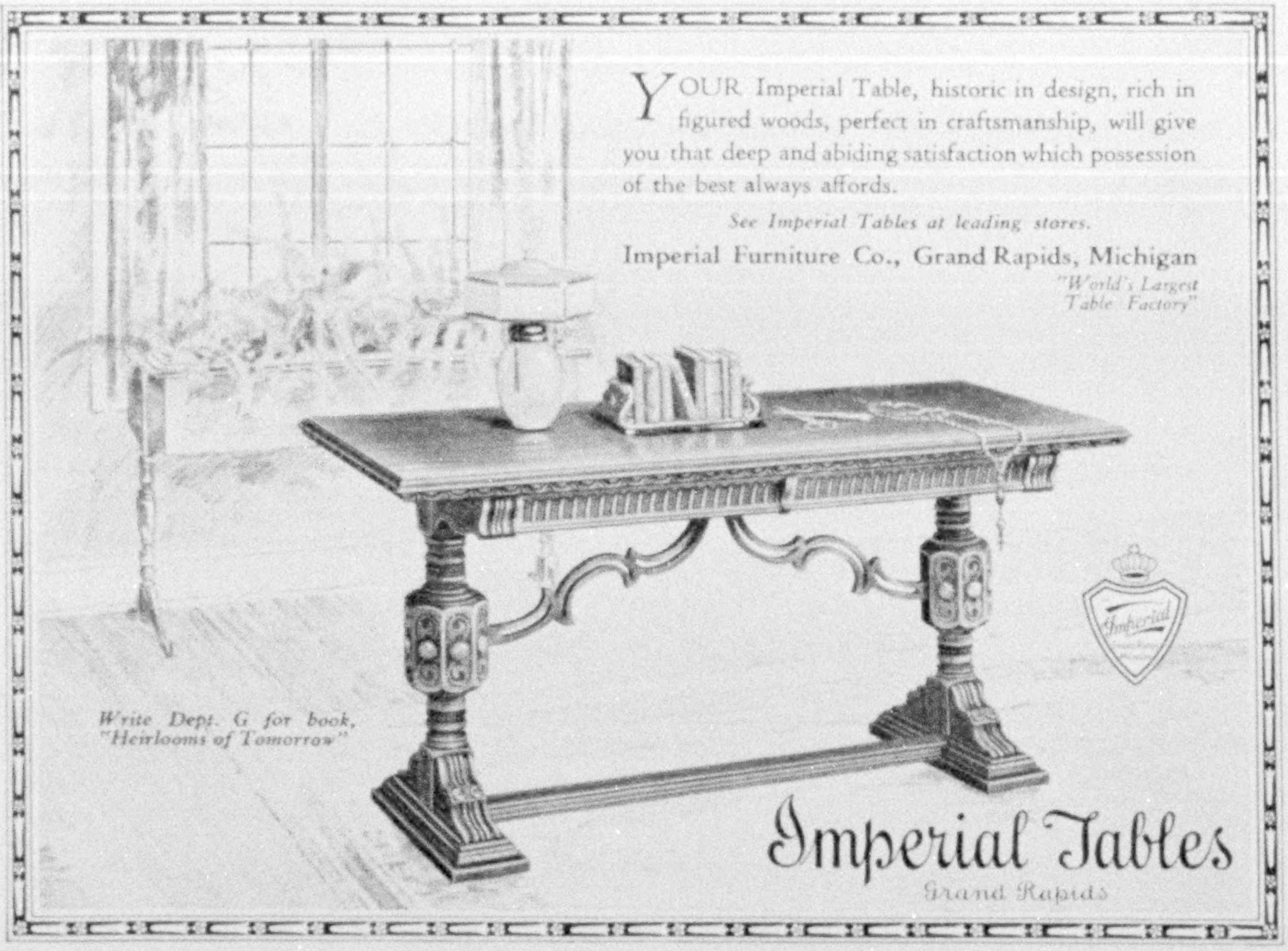
Look for This Tag at The End of The Roll

THE NEW JERSEY WIRE CLOTH COMPANY
634 South Broad Street
Trenton New Jersey
All Grades of Wire Cloth Made of All Kinds of Wire

JERSEY

Copper Screen Cloth

Made of Copper 99.8% Pure



DUES

Annual membership in U. S., $3.00; annual membership abroad, $4.00; Canada, $3.50; life membership, $100. Please make remittances payable to the National Geographic Society, and if at a distance remit by New York draft, postal or express order.

RECOMMENDATION FOR MEMBERSHIP

IN THE

NATIONAL GEOGRAPHIC SOCIETY

The Membership Fee Includes Subscription to the National Geographic Magazine

PLEASE DETACH AND FILL IN BLANK BELOW AND SEND TO THE SECRETARY

------------------------------192

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington, D. C.:

I nominate --

Occupation --
(This information is important for the records.)

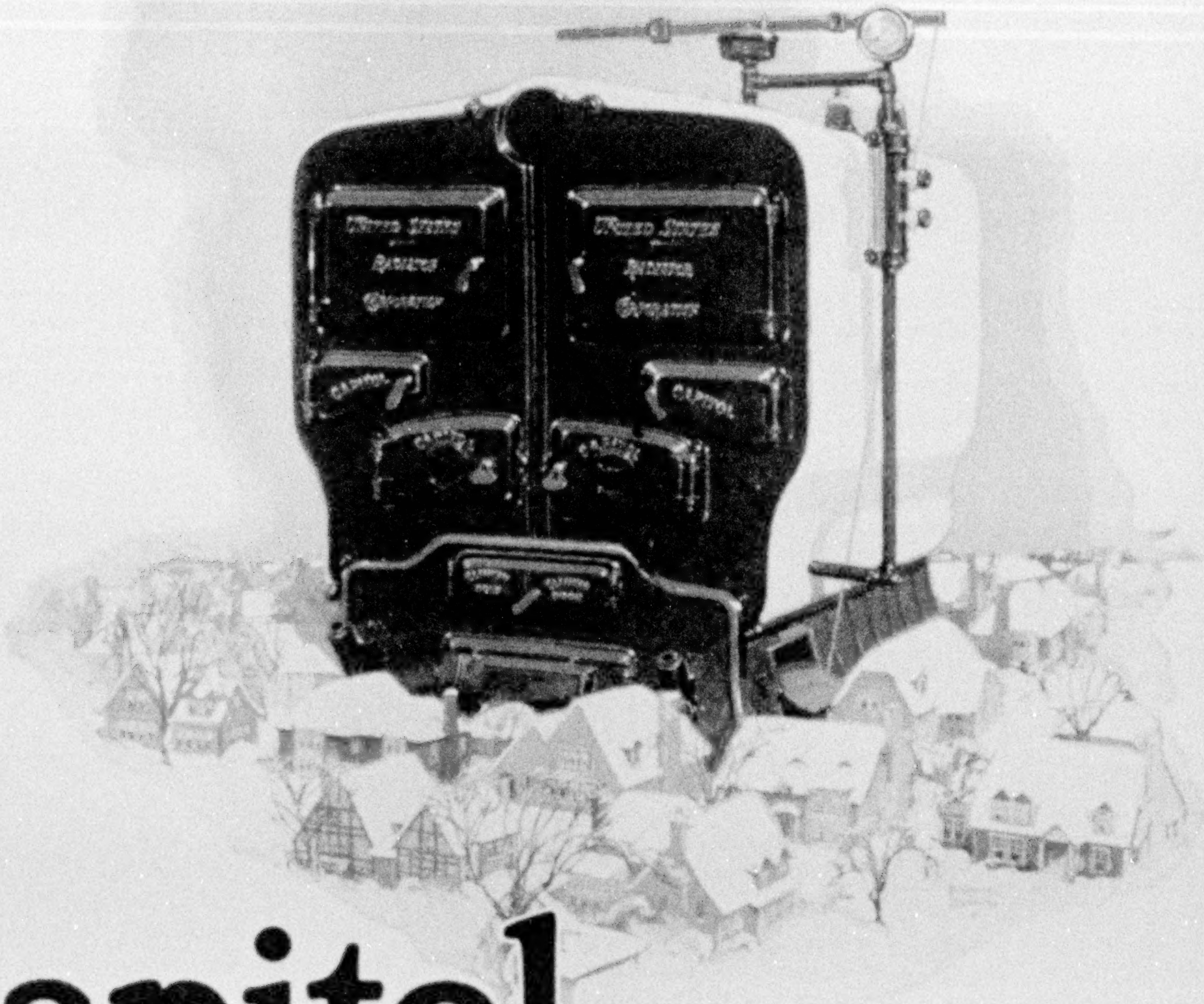
Address --

----

for membership in the Society.

Name and Address of Nominating Member

5-25



Capitol Boilers

Branch and Sales Offices

*Boston	*Baltimore	*Louisville
*Springfield, Mass.	Buffalo	*St. Paul
*Portland, Me.	Pittsburgh	*St. Louis
*Providence, R. I.	*Cleveland	*Kansas City
*Troy, N. Y.	*Columbus	*Des Moines
New York	*Cincinnati	*Omaha
*Brooklyn	*Detroit	*Denver
*Harrison, N. J.	*Chicago	*Seattle
*Philadelphia	*Milwaukee	*Portland, Ore.
	*Indianapolis	

*Warehouse stocks carried at points indicated by star

UNITED STATES RADIATOR CORPORATION

General Offices, Detroit, Michigan

We shall be glad to send you an illustrated booklet which fully explains the modern idea in house heating.

Capitol Boilers are made in a wide variety of types and sizes to meet the requirements of any heating need.

You will find them in great modern apartment buildings and modest cottages. Large or small, these boilers conform to one high standard of efficiency and one manufacturing ideal.

No heating plants can offer greater economy of operation or more impressive service records because Capitol engineering is as old as the industry—and as modern as current heating science.

A Capitol is a safe boiler to buy and a comfortable boiler to own. Many thousands of users will tell you just that—and any heating contractor will confirm it.

How Springy the Bristles Feel!

The best painters are—
WHITING-ADAMS
BRUSHES.

Get a *good* brush—one that will last and give years of satisfactory service. WHITING-ADAMS BRUSHES give the kind of service you want

WHITING-ADAMS BRUSHES

Send for Illustrated Literature

JOHN L. WHITING-J. J. ADAMS CO.
BOSTON, U. S. A.
Brush Manufacturers for Over 116 Years and the Largest in the World

How can screens beautify the home?

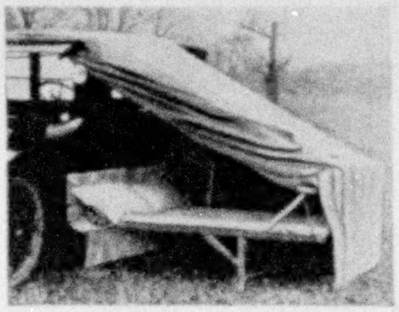
The architect condemns the ordinary clumsy wooden screen. He says: "Choose unobtrusive screens, with narrow, metal frames, strong and durable, and with non-rusting bronze screen cloth—like Higgin All Metal Screens. They assist in securing my architectural effects."

Send for booklet

This free booklet tells how to correctly and attractively screen every type of door and window.

HIGGIN ALL METAL WINDOW SCREENS

THE HIGGIN MFG. CO., 505 Washington St., Newport, Ky.



Schilling Auto-Camp

THE QUICK AND EASY WAY

A perfect bed. Frame constructed of pressed steel, all parts attached. Only Mattress Fabric with supporting elements and resting surface woven into one complete unit. Not the canvas cot type, but a real sagless spring mattress. CAN'T TANGLE OR KINK. Waterproof tent. Outfit set up or collapsed in three minutes. NO BEDS TO TOTE. NO STAKES TO DRIVE. Furnished either set up with or detached from car. FROM FACTORY TO YOU. *For 1925 Catalogue address Dept. E.*

L. F. SCHILLING CO., Salem, O.

120 Gladiolus Bulbs
12 Months Subscription $3

"THE FLOWER GROWER"

Unique among monthly magazines

Luther Burbank says: "No other so thoroughly practical, well edited, and generally interesting."

THE FLOWER GROWER is all that the name implies *AND MORE.* It tells all about flowers and many other things of interest to those who aspire to better living conditions and more beautiful surroundings. It teaches *balanced activities and a sane perspective.*

Yearly subscription, $2.00. More than 500 reading pages.

OFFER: 120 Gladiolus Bulbs, grown in the Editor's own garden, with full details for planting and culture, postpaid, and a year's subscription (12 issues), **both for $3.00.** The best value yet. You cannot fail with these bulbs. They bloom in all the shades of the rainbow.

Read THE FLOWER GROWER and see what happens.

Madison Cooper, Editor, 24 Court St., Calcium, N.Y.

SAVO Flower and Plant Box

GROW LARGER, STRONGER, HEALTHIER PLANTS

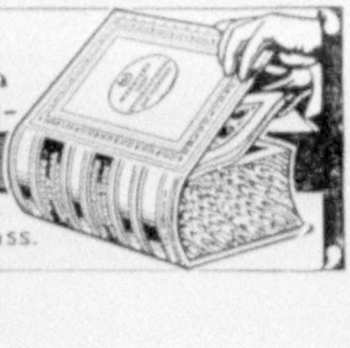
Self-Watering
Sub-Irrigating
Leak-Proof
Rust-Proof
Six Sizes

SAVO Steel Boxes are ideal for windows, porches, ledges, sun parlors, etc. Perfect air circulation and drainage. Artistic in design. Beautifully finished in dark green or aluminum. You can move SAVO boxes indoors or out and have beautiful flowers the year around.

WRITE FOR FREE CATALOG

SAVO MFG. CO.—Dept. W5—111 W. Monroe St., Chicago, Ill.

Whatever Your Question;—be it the pronunciation of **Fascista**, the spelling of a puzzling word, the location of **Esthonia** the meaning of **soviet, realtor, vitamin**, etc., this **Supreme Authority**—



WEBSTER'S NEW INTERNATIONAL DICTIONARY

contains an accurate, final answer. 407,000 Words 2700 Pages 6000 Illustrations
Regular and India-Paper Editions G. & C. MERRIAM CO., Springfield, Mass.
Write for specimen pages, prices, etc., and FREE Pocket Maps per Geographic

Here is the Prize Recipe
Also Winners of the First Five Prizes

$1,000.00 in cash prizes
For NEW ways of using

G. Washington's
Delicious-Instant
Coffee

FIRST PRIZE, $500.00
ADELE EDWARDS, 23 Winant Avenue,
Port Richmond, S. I., N. Y.

FIRST PRIZE RECIPE

G. Washington's Coffee Apple Cream Cake ½ cup of butter, 1 cup sugar, 2 eggs, 1¾ cups flour, 2 teaspoons baking powder, ¼ teaspoon salt, ½ cup milk, 1 teaspoon G. Washington's Coffee. Cream butter, add sugar gradually, then eggs well beaten. Next sift and add flour, baking powder and salt, alternately with the milk in which the G. Washington's Coffee has been dissolved. Beat thoroughly and bake in moderately hot oven in two greased square layer-cake pans.

G. Washington's Coffee Apple Filling 1 pound apples, pared and grated, 1 pound powdered sugar, rind and juice 3 lemons, ¼ pound sweet butter, 2 well-beaten eggs, 1 tablespoon G. Washington's Coffee, 1 cup finely chopped pecans (optional). Put apples, sugar, rind and juice of lemons with butter into upper vessel of double boiler, place over hot water over moderate fire, and when butter is melted add well-beaten eggs and cook until thick—about 15 minutes—stirring frequently. When cooked add the G. Washington's Coffee, dissolved in 1 tablespoon hot water, and the pecans if used. When cold spread between layers of cake.

G. Washington's Coffee Frosting ¾ teaspoon G. Washington's Coffee, dissolved in ¾ cup boiling water, grated rind 1 orange, 1 tablespoon orange juice, 1½ cups brown sugar, ½ cup butter, ¾ cup thin cream, 1 egg yolk. Cook together all ingredients except egg yolk until a little tested in cold water forms soft ball. Cool slightly, add beaten egg yolk and beat until thick enough to spread.

2nd Prize, $250.00
Mrs. Huldah McKee
4435 Clara Street
New Orleans, La.

3rd Prize, $75.00
Mrs. Henry B. Graybill
Hong Lok
Canton, China

4th Prize, $50.00
Nina de Sola Mendes
Pelham
New York

5th Prize, $25.00
Mara Serriov
General Delivery
Sarasota, Florida

The contest proved a revelation as to the many different ways in which G. Washington's Coffee can be used—and don't forget it makes delicious Coffee!

We have prepared a folder of the prize-winning recipes and names of all winners, which will be sent upon request.

Sold in three sizes, small, medium and large.

G. WASHINGTON COFFEE REFINING CO.
522 FIFTH AVENUE
NEW YORK

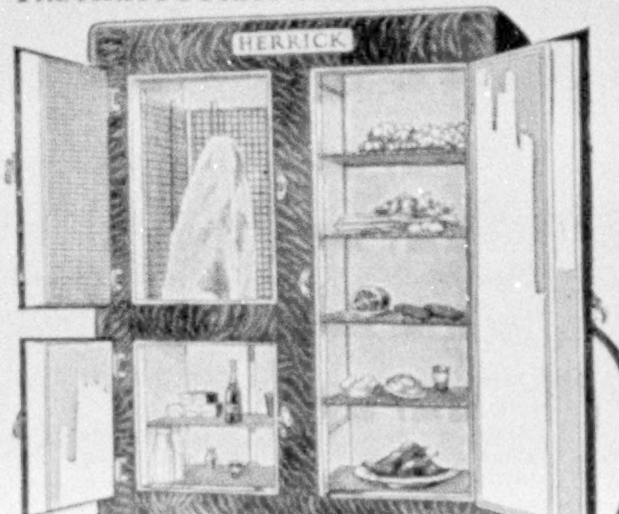
2 Ways to Prevent Food Waste

1. An Active Boy
—to eat it!
2. A HERRICK Refrigerator
to keep it!

If you haven't the boy, you can at least have the *Herrick*. Its exclusive method of cold dry air circulation prevents taint, mold and interchange of flavors. *Herrick* five-purpose mineral wool insulation and solid oak construction make both the ice and refrigerator last longer. *Herrick* Outside Icing and direct water cooling attachment, if desired.

Send for free Booklet "Correct Refrigeration"
HERRICK REFRIGERATOR COMPANY
205 River Street, Waterloo, Iowa

Food keeps BEST *in the*
HERRICK
THE ARISTOCRAT OF REFRIGERATORS



For Ice or Mechanical Refrigeration

A Garden Full of Dahlias for $3.50

New and Rare Exhibition Dahlias

Few flowers, whether used for garden decoration or principally for cut blooms to decorate the home, are as responsive to simple garden culture as our Modern Dahlia. It has made wonderful advancement in size of bloom, habit of growth, and profuse blooming qualities.

In order to further its now great popularity, we are offering this collection of

12 Dahlia Tubers for $3.50

—one each of 12 distinct varieties, not labeled, which if purchased separately according to name would cost not less than $10.

Order Your Tubers Now so as to have them ready to plant any time after the tenth of May or when all danger of frost is past.

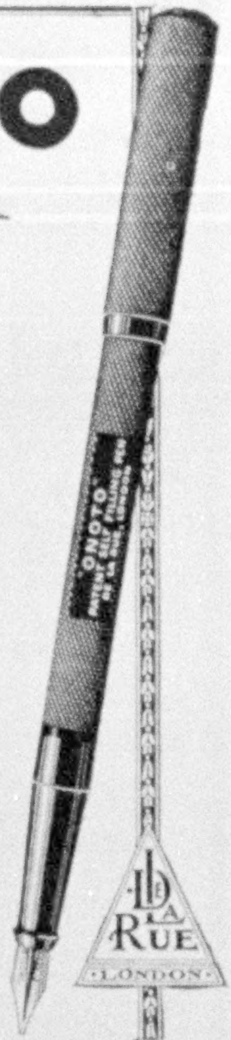
Mail this advertisement with check, money order, cash, or stamps, and secure this exceptional collection, sent prepaid to any point in the United States.

Our 1925 Spring Seed Annual sent on request.

Stumpp & Walter Co

30 and 32 Barclay Street — New York

Onoto THE Pen



Would you like

a leak-proof, self-filling fountain pen with an ink capacity double that of a sac-filler?

Then buy an Onoto!

It fills in a flash by vacuum. Its double feed, above and below the nib, maintains the ink at the very point, ready to write at all times and without effort. And—when shank is closed, the ink flow is shut off so it cannot leak—in any position, in pocket, bag or even in the mail.

In two proven sizes, each $5.

At better stores. Write for illustrated literature and dealers nearest you.

THOMAS DE LA RUE & CO., Ltd.
450 Fourth Ave., New York

No ink is quite so good as Onoto Ink.

DE LA RUE
LONDON

Who's Who of Outdoor Friends

Wild Animals of North America

The Portrait Book de luxe of the Little and Big Animals We Wonder About in Dooryards, Parks and Forests

The 127 full-color plates and many other illustrations and delightful text enable one to recognize and enjoy the animals in near-by woodland or to track in imagination American big game in distant wilds.

Illustrated circular on request

Buckram, $3, postpaid in U. S.

NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

Tacna-Arica?

President Coolidge has designated General Pershing to direct the plebiscite in which the Tacnans are to vote whether they are Peruvians or Chileans. The Society's up-to-minute, 6-color

MAP OF SOUTH AMERICA

shows the exact region in dispute and gives traveler and business man the latest authentic data on the entire continent.

Special Map Paper, $1; Cloth, $1.50, postpaid
(Foreign mailing 25 Cents)

Descriptive Map List on Request

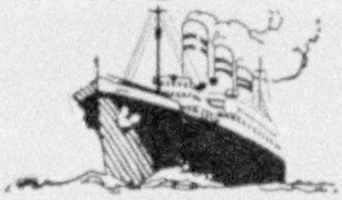
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

THIS MAGAZINE IS FROM OUR PRESSES

JUDD & DETWEILER, INC.
Master Printers
ECKINGTON PLACE AND FLORIDA AVE.
WASHINGTON, D. C.

Queen of World Cruise Steamships

Resolute



Two World Cruises

From New York,
Oct. 24th, 1925.

From San Francisco,
Feb. 9th, 1926.

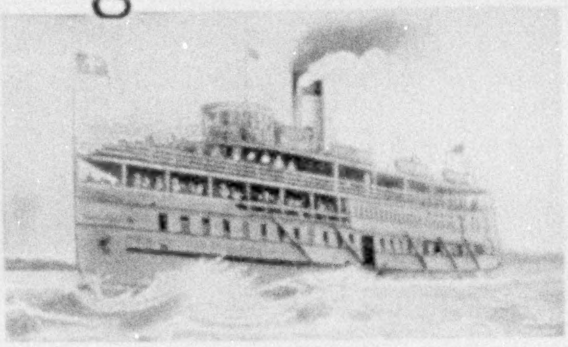
There is no better ship—more efficient management—or attractive itinerary. Write for details.

UNITED AMERICAN LINES

HARRIMAN LINE

35-39 Broadway, New York; 131 State St., Boston; 230 South 15th St., Philadelphia; 177 No. Michigan Ave., Chicago; 574 Market St., San Francisco; 87 St. James St., Montreal; or local agents.

Niagara to the Sea



Shooting the Rapids

The most satisfying trip in America for health and recreation. Almost 1000 miles of lakes, rivers, and rapids, including the Thousand Islands, the exciting descent of the marvelous rapids, the historic associations of Montreal, quaint old Quebec, with its famous miracle-working Shrine of Ste. Anne de Beaupré and the renowned Saguenay River, with its stupendous Capes, "Trinity" and "Eternity," higher than Gibraltar.

Send 2c postage for illustrated booklet, "Niagara to the Sea," including map and guide, to JOHN F. PIERCE, Pass. Traffic Manager, Canada Steamship Lines, Ltd., 107 C. S. L. Building, Montreal, Canada.

CANADA STEAMSHIP LINES

York, "the walled city of great antiquity" on the London and North Eastern Railway

Twenty Centuries in a Day

You cannot exactly appraise the value of a "London-North-Eastern" tour through Britain. It means seeing everything you've ever planned to see—steeping yourself in the glamour of England's literary and historic traditions.

There's York, for example—one of a countless number of intensely interesting "London-North-Eastern" stopping-off places—enchanted, colorful, old York, intriguingly mysterious in its ancientry. A day with her carries you back through twenty centuries of English life—to the Roman Invasion.

The London and North Eastern Railway traverses the historic side of Britain. It's the "Cathedral Line"—track of the "Flying Scotsman", shortest and swiftest to Scotland. And it's the ideal link—via Harwich—between England and Continental Europe.

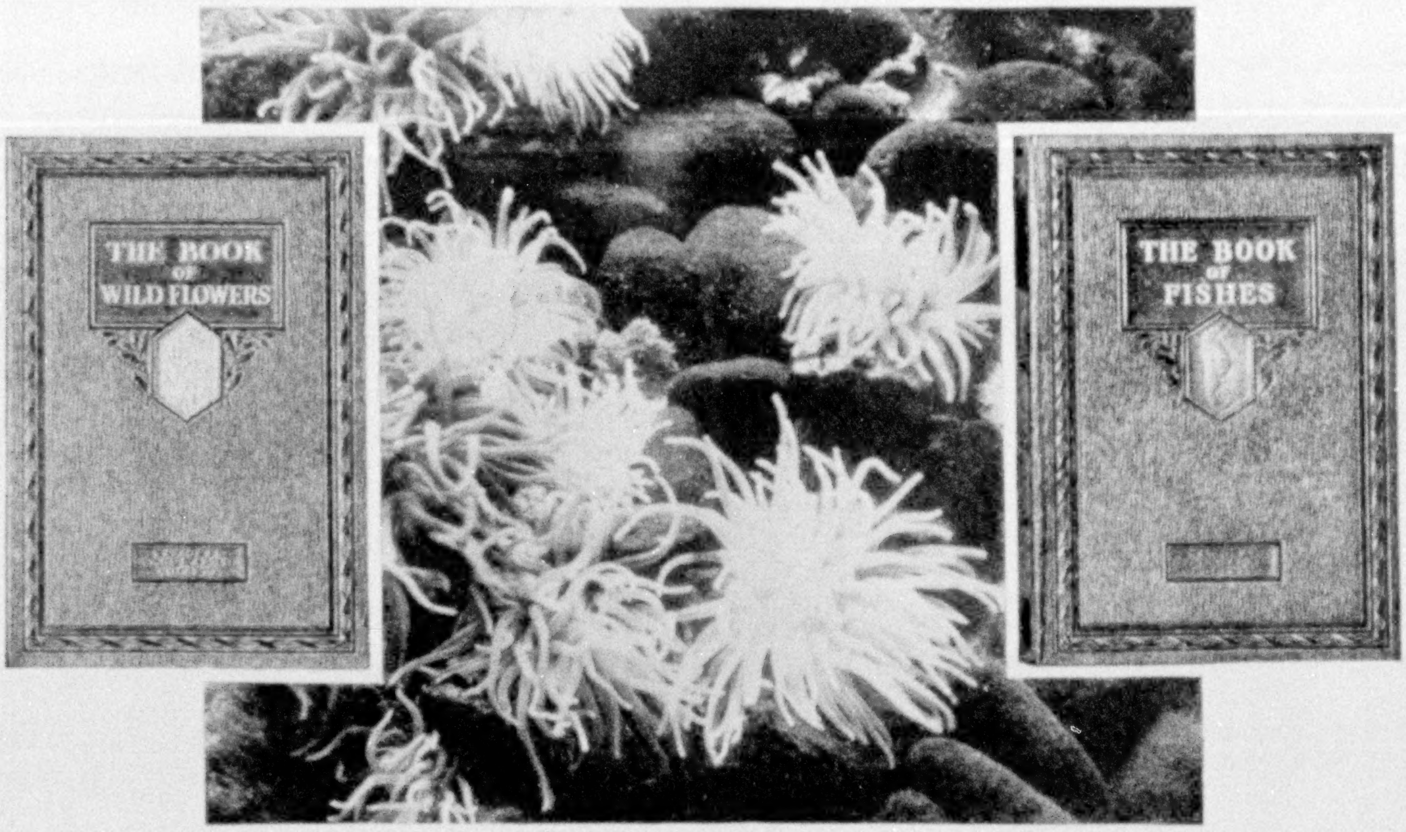
Let the "London-North-Eastern" American representative plan your British tour for you. Save time and money, and still see everything that matters. Absorbingly interesting illustrated booklets for the asking. Communicate with

H. J. KETCHAM, General Agent
London and North Eastern Railway
311 Fifth Avenue, New York

LONDON AND NORTH EASTERN RAILWAY

OF ENGLAND AND SCOTLAND

ARE THESE FISHES OR FLOWERS?



WHITE-ARMED ANEMONE—A LOW FORM OF MARINE ANIMAL LIFE

The BOOK OF WILD FLOWERS

By William Joseph Showalter
and Other Authorities

242 full-color portraits of flowers and plants by Mary E. Eaton, the world's leading painter of flowers; 8 full-page color microphotographs of grasses by E. J. Geske; many monotint engravings; 250 pages.

PREPARE for Spring with this "Who's Who of the Wild Flowers." It enables you to identify easily and name the 242 varieties of wild plants—including the State flowers—which pique our curiosity in yard, park, or countryside. Accompanying these remarkable color plates are flower "biographies" which tell, in a simple but fascinating narrative, the things we want to know about wild plants—how they grow and what purpose, as medicine or food, they serve. It is an unfading bouquet of the spring and summer flowers. Invaluable in the home—indispensable for schools.

The BOOK OF FISHES

Game Fishes, Food Fishes, Shellfish and Curious Citizens of American Ocean Shores, Lakes and Rivers

By John Oliver LaGorce and
Other Authorities

Illustrated with full-color portraits of 92 fishes in under-water action, painted by Hashime Murayama; 134 other engravings; 244 pages.

FISHERMEN, big or little, will find lasting delight in the remarkable color plates which should enable easy identification of their catch, however unusual. The fascinating fish biographies and chapters on fishing and fisheries are by such authorities as John Oliver LaGorce, Miami Aquarium; Charles Haskins Townsend, N. Y. Aquarium; Hugh M. Smith, former U. S. Commissioner of Fisheries; L. L. Mowbray, N. Y. Aquarium; Dr. John T. Nichols, Natural History Museum, and F. W. Wallace. The ideal gift for sportsmen.

Set a New Standard for Nature Books

Royal Octavo (10 x 7 in.); Molloy-made art binding in brown, bronze, and gold; $4 each, postpaid in U. S.; foreign mailing, 25 cts. Booklet in full color on request. Obtainable only from the

National Geographic Society, Washington, D. C.

National Geographic Society, Washington, D. C.

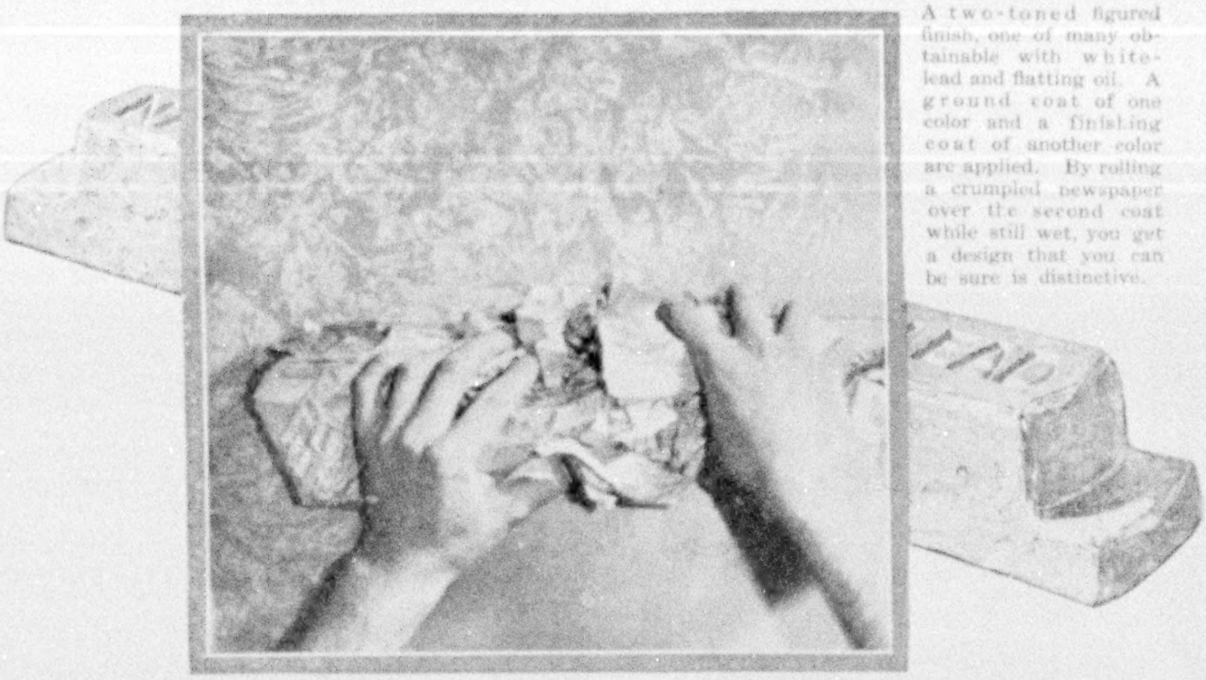
For enclosed $____________send__________copies of Book of Wild Flowers;

__________copies of Book of Fishes.

Name______________________________

Address______________________________

5-25



A two-toned figured finish, one of many obtainable with white-lead and flatting oil. A ground coat of one color and a finishing coat of another color are applied. By rolling a crumpled newspaper over the second coat while still wet, you get a design that you can be sure is distinctive.

Interiors of rare beauty now within the means of all

WHEN great-grandfather was a boy, the interior charm of Colonial homes was due in large measure to woodwork finishes of rare beauty—finishes built up with as many as five or six paint coats.

Up to a short time ago, such handsome finishes were a luxury that only the wealthy could afford. Today, however, a new flat paint puts similar interior finishes within the reach of all, not only for woodwork but for walls.

This new flat paint costs less because fewer coats are required and because it can be applied more quickly. It leaves a finish free from brush marks, laps and streaks. It forms a durable, moisture-proof film that becomes a part of the covered surface. It can be washed repeatedly without injury. It can be tinted to any desired color. With it many very beautiful and distinctive effects can easily be obtained, among them two-tone figured finishes, like the one shown above.

This new flat paint is made of Dutch Boy white-lead and Dutch Boy flatting oil. White-lead, which is the pigment ingredient, is made from the metal, lead.

Send for samples and booklet

Our booklet, "Painting—Protective and Decorative" gives further information about this new flat paint. It also contains color plates of house interiors and exteriors and of interesting and unusual artistic wall finishes that can be obtained with paint. We will be pleased to send you this booklet accompanied by actual painted samples of the two-tone figured finish.

National Lead Company maintains a Department of Decoration made up of experts who will gladly give advice on the proper selection of the colors for interiors of new houses or old. Address your inquiries to Department of Decoration in care of our nearest branch.

The figure of the Dutch Boy Painter shown here is reproduced on every keg of Dutch Boy white-lead and is a guarantee of exceptional purity.

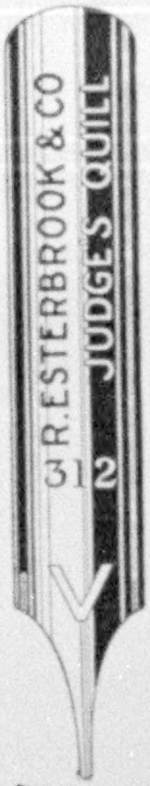
In addition to Dutch Boy white-lead and flatting oil, National Lead Company makes lead products for practically every purpose to which lead can be put in art, industry and daily life. If you desire specific information about any use of lead, write to our nearest branch.

"Save the surface and you save all"

NATIONAL LEAD COMPANY

New York, 111 Broadway; Boston, 131 State Street; Buffalo, 116 Oak Street; Chicago, 900 West 18th Street; Cincinnati, 659 Freeman Avenue; Cleveland, 820 West Superior Avenue; St. Louis, 722 Chestnut Street; San Francisco, 485 California Street; Pittsburgh, National Lead & Oil Co. of Pa., 316 Fourth Avenue; Philadelphia, John T. Lewis & Bros. Co., 437 Chestnut Street.

Here's a Fine Stub



The Esterbrook Judge's Quill is a favorite among writers who like a fine-pointed stub pen, resilient in action.

Whether you prefer a stub, fine or oval point, there is an Esterbrook pen designed exactly to fit your handwriting.

Send for Interesting Booklet

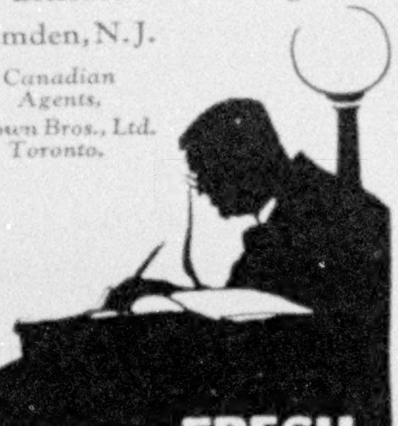
Booklet of 100 historic autographs and the 12 most popular pens in the world sent on receipt of 15 cents.

Address Department N

Esterbrook Pen Mfg. Co.

Camden, N.J.

Canadian Agents, Brown Bros., Ltd. Toronto.



Always a FRESH Esterbrook

CLARK'S FAMOUS CRUISES

NORWAY AND WESTERN MEDITERRANEAN

From New York, July 1st, by specially chartered popular new Cunarder "Lancastria," 17,000 tons,

53 DAYS, $550 upward

over fascinating itinerary, including Lisbon (Madrid), Cadiz, Seville (Granada, Alhambra), Gibraltar, Tangier, Algiers, Naples, Rome, Genoa, Riviera, Gothenburg, Christiania, Bergen, Sogne Fjord, Edinburgh, Trossachs, Berlin. Stop-over privileges with return passage by Cunarders.

ATTRACTIVE NORTH CAPE TOUR

MAY 9TH FROM NEW YORK; TWO MONTHS

In 1926—Around the World Cruise, Jan. 20, including Peking, 128 days, $1250 to $3,000; Mediterranean Cruise, including Lisbon (Madrid), Tunis, Carthage, 15 days Palestine and Egypt, Jan. 30, S. S. Transylvania, 62 days, $600 to $1,700. Originator of Around the World Cruises. Longest experienced cruise management. Established 30 years.

FRANK C. CLARK, Times Bldg., New York

TRAVEL PICTURES ARE Decorative and Instructive

Fasten up the pictures of your last journey, whether it was taken in person or through the pages of GEOGRAPHIC, with

Moore Push-Pins

Glass Heads—Steel Points

The fine steel points will not injure the picture or the wall. For heavier framed pictures, and other wall decorations, use

Moore Push-less Hangers

"The Hanger with the Twist"

10c. Pkts. Everywhere

Moore Push-Pin Co., Philadelphia, Pa.

The only belt with the Patented Comfort Feature, which combines absolute comfort, perfect trousers support, and prevents curling and binding at the sides.

BRAXTON THE BELT FOR MEN

Handsome Jewelry Buckles. Many beautiful leathers and finishes. *At all the best dealers.*

The Perkins-Campbell Co.

New York Cincinnati Chicago

THE GLEN SPRINGS

WATKINS GLEN, N. Y., ON SENECA LAKE

Open All The Year. Wm. E. Leffingwell, Pres.

A Mineral Springs Health Resort and Hotel. The Pioneer American "cure" for heart disorders. Sporty golf course.

A BENCH SHOW IN ITSELF

The Book of Dogs

The character, heroism, and sagacity of mankind's best friend

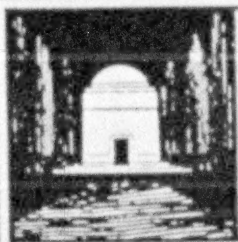
This book, with its 128 full-color dog portraits by Louis Agassiz Fuertes, its authoritative descriptions of breeds and canine character, is a guide to dog-fancier and a delight to all who love dogs.

Circular on Request

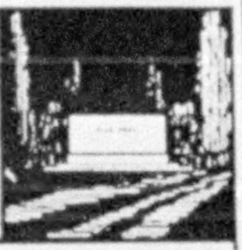
Bound in Buckram, $2, postpaid in U. S.

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.



FOR THAT UNMARKED GRAVE OR FAMILY PLOT



PRESBREY-LELAND-MEMORIALS

AT LESS THAN ORDINARY COMMERCIAL MONUMENTS.

TWELVE DESIGNS HAVE BEEN CREATED BY THE SAME TALENT THAT PRODUCED 20,000 PRESBREY-LELAND MEMORIALS IN EVERY STATE AND SEVERAL FOREIGN COUNTRIES.

THE PRICES—$100 TO $1000—A LOGICAL RESULT OF ECONOMY IN PRODUCTION—ARE BASED UPON UTILIZING SURPLUS GRANITE RESULTING FROM QUARRYING FOR LARGER WORK.

WHITE DUMMERSTON, BY GOVERNMENT TEST THE HARDEST OF AMERICA'S NON-STAINING WHITE GRANITES, IS EXCLUSIVE WITH US. THE FINISH IS OUR SAME HIGH STANDARD MAINTAINED FOR A QUARTER CENTURY.

THE MONUMENTS ARE SHIPPED DIRECT TO YOU FROM VERMONT, THE GRANITE CENTER OF THE WORLD—NO INTERMEDIATE PROFITS OR EXPENSES.

WRITE FOR PORTFOLIO "K"

THE PRESBREY-LELAND CO.,
681 FIFTH AVENUE, NEW YORK

PRESBREY-LELAND-MAVSOLEVMS

At the Amazingly Low Price of $615

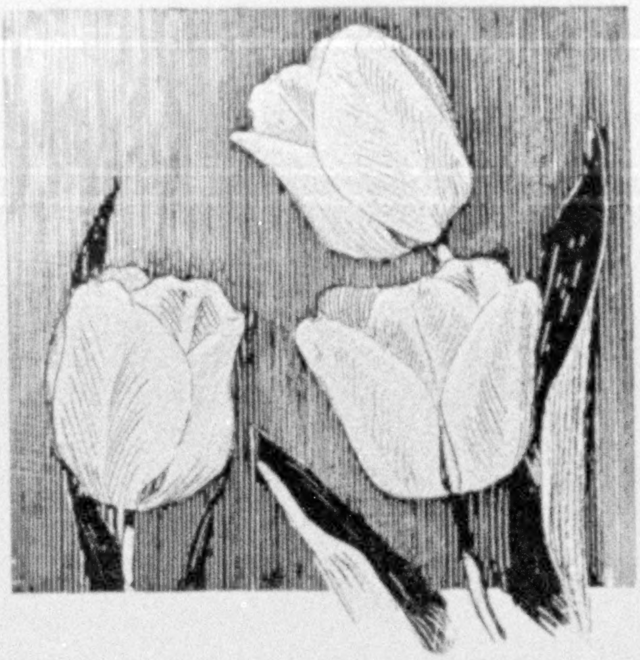
THE Bossert RADIO Bungalow costs only $615, delivered to YOU complete. Has living room, 12x12 ft.; two bedrooms, 9x9 ft.; kitchen, 6x9 ft.; and bath. Rooms perfectly arranged, light and airy. Here is the most remarkable value ever offered in portable bungalows. No carpenters or skilled mechanics required. Two men can erect it within a day and a half. It is sturdily constructed and will last for years.

The RADIO Bungalow is fully portable. It can be taken down readily, transported and put up again without trouble, so that it can always be your summer home no matter where your fancy takes you. Write NOW for order form and folder completely describing the RADIO Bungalow.

LOUIS BOSSERT & SONS, Inc.

Largest Lumber Plant In the East

1313 Grand St. (House Dept.) Brooklyn, N. Y.



Choose Early—

and Pick the Best

from the Finest Bulb Gardens in Holland.

For nearly forty years Elliotts have been America's foremost bulb specialists, bringing to American gardens each season the cream of Holland's crops. Because they are selected *early* by Elliott representatives right in the growers' fields, Elliott bulbs are big, full of life, sure to grow and bear the largest and most beautiful flowers.

Special Offer—Giant Tulips

Elliott quality bulbs of ten beautiful named varieties. Flowers often 3½ inches in diameter; stems over 2 feet tall.

Baronne de la Tonnaye. Vivid pink.
Bronze Queen. Buff and golden bronze.
Clara Butt. Delicate salmon-pink.
Dream. Beautiful lilac.
Euterpe. Mauve-lavender.
Farncombe Sanders. Fiery scarlet.
Faust. Velvety maroon-purple.
Glow. Deep vermilion.
Philippe de Commines. Violet.
Pride of Haarlem. Deep old-rose.

Special	Collection A,	100 bulbs,	10 of each.	$4.95
	Collection B,	250 bulbs,	25 of each.	11.75
	Collection C,	1000 bulbs,	100 of each.	45.65

Above special offers good only until July 1. Order now. You can pay when bulbs arrive in September, or take 5 per cent discount for cash with order. Complete directions for planting and care sent.

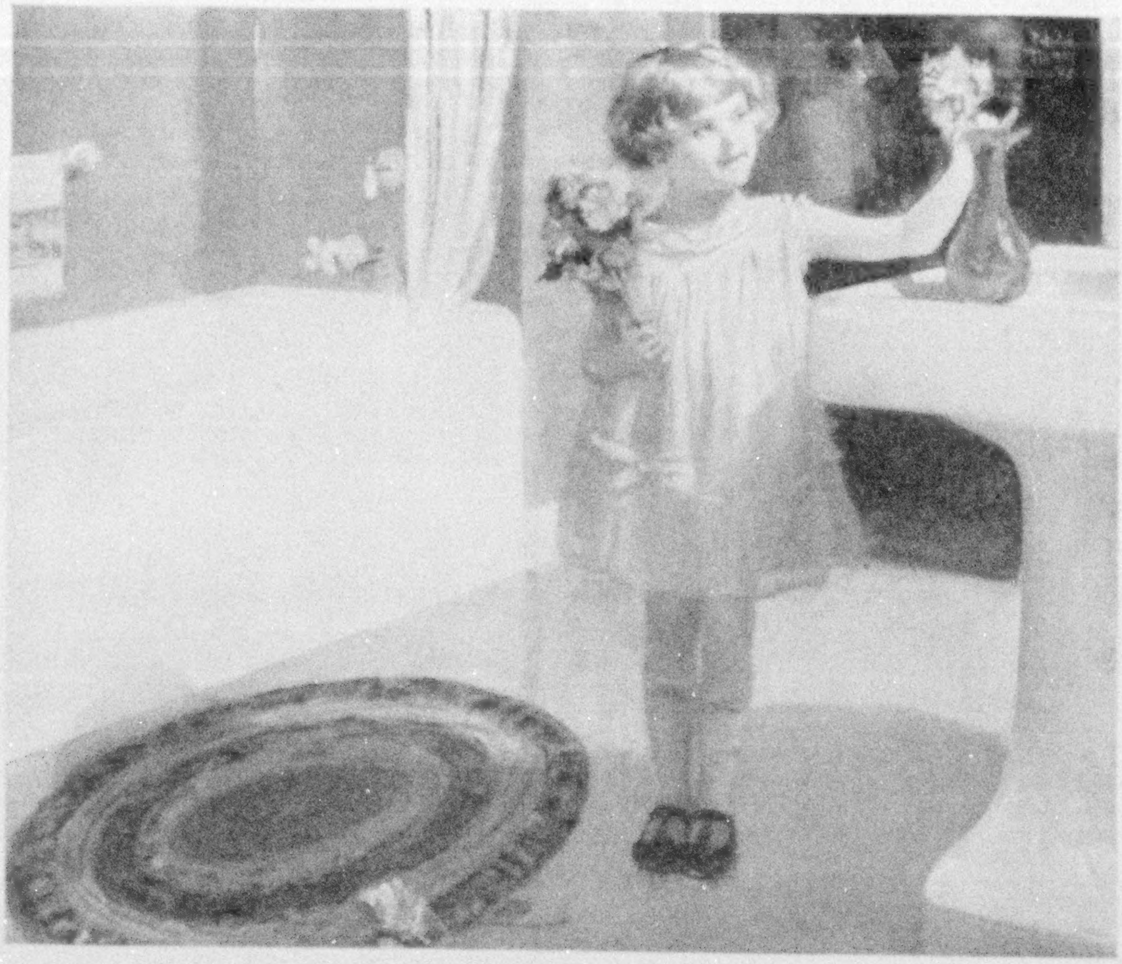
FREE—The Bulb Book for 1925

Elliotts' Import Bulb Catalog is the most complete and helpful book of its kind ever offered to American gardeners. It tells the best and easiest ways to grow Hyacinths, Tulips, Daffodils, Lilies, and many other bulbs, indoors and out, and describes thousands of the best varieties.
The special import prices quoted in Elliotts' bulb book are good only until July 1. Make sure of getting the best at the season's lowest prices.

Write for catalog today

ELLIOTT NURSERY COMPANY

582 Magee Bldg. Pittsburgh, Pa.



A TINY garden will fill the house with lovely flowers. Just so, a simple bathroom, an inexpensive one, a little one if need be, can bring the thrill of clean, fine living. For it may have the same choice fixtures of Kohler Enameled Plumbing Ware that are used in costliest bathrooms. No other good ware is priced more moderately. Yet no fixtures can surpass in alluring grace or lustrous beauty those which bear the name "Kohler," faintly fused into snowy enamel. . . . Write for Booklet E. It shows fine fixtures for bathroom, kitchen, and laundry.

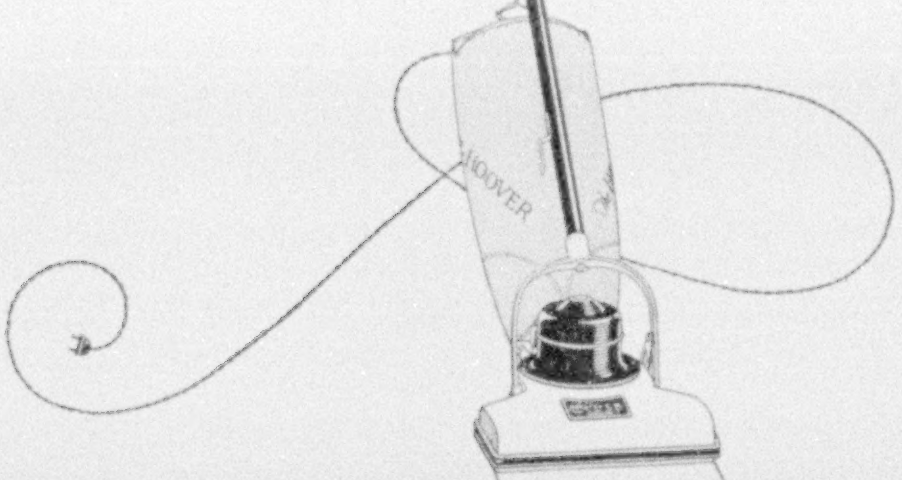
The Public School at Kohler

It is no ordinary school. But Kohler is no ordinary village. We are as proud of Kohler as we are of the quality of Kohler enameled plumbing ware and private electric plants

Kohler Co., *Founded 1873*, Kohler, Wisconsin
Shipping Point, Sheboygan, Wisconsin
BRANCHES IN PRINCIPAL CITIES

KOHLER OF KOHLER
Enameled Plumbing Ware

A Complete House Cleaning SERVANT



Shall your rugs continue to be a hiding place for the dirt that *only beating will dislodge?* as you can prove*. . . . Or will The Hoover eliminate the semi-annual housecleaning, by keeping your rugs immaculate the year through—*beaten, swept and suction-cleaned electrically?* Shall dust accumulate in the "hard-to-reach" places? Or will Hoover powerful suction and the new air-cleaning tools keep your home dust-free? There can be only one answer. So don't delay! Let your Authorized Hoover Dealer deliver a Hoover *today*, complete with attachments. All he will ask is $6.25 down. Balance is payable in easy monthly installments.

CLEANS

Rugs, stair carpets, draperies, upholstered furniture, under beds, beneath and behind radiators, over ledges and mouldings, behind books on shelves, mattresses, clothing, interiors of automobiles—anywhere dirt collects

The HOOVER

It BEATS ... as it Sweeps as it Cleans

*TO PROVE RUGS NEED BEATING: Turn over a corner of a rug; with the handle of an ordinary table-knife, or something of equal weight, give the under or warp side 15 to 25 sharp *taps* and watch the dirt dance out from the nap depths onto a piece of paper. Feel the destructive character of this grit. *This is the dirt only beating will dislodge.* Correct use of The Hoover causes this embedded dirt to be *vibrated* to the surface by the rapid, gentle *tapping* of the Hoover brush, as powerful suction *lifts* the rug from the floor and draws all the dirt into the dust-tight bag

THE HOOVER COMPANY, NORTH CANTON, OHIO

The oldest and largest maker of electric cleaners · The Hoover is also made in Canada, at Hamilton, Ontario

PRESS OF JUDD & DETWEILER, INC.
WASHINGTON, D. C.

Use Colgate's—

It *removes causes* of tooth decay

The Safe Way to Protect Your Beauty and Health

GOOD TEETH are as necessary to good looks as pretty eyes and a lovely complexion. And good teeth are more necessary to good health than they are to beauty.

Today dental science, through preventive dentistry, is trying to save teeth from decay—to prevent infections that may destroy your health and happiness. Colgate's Ribbon Dental Cream is closely allied with this move for better teeth and better health.

"Washes"—does not scour

Colgate's is a preventive dentifrice—safe, effective, and pleasant to use because of its delightful taste. It *removes causes* of tooth decay by the gentle "washing" action of its non-gritty chalk and tasteless soap. These are the two ingredients that authorities say are most important in a dentifrice.

Of course there are no curative claims for Colgate's. No tooth paste or powder can cure. That is a dentist's function. Colgate's keeps your teeth clean, and cleanliness is the best preventive measure known.

Colgate's is free from grit and harsh ingredients. It is sensibly made, sensibly advertised and sold at a sensible price—25 cents for the large tube, at your favorite store.

COLGATE & CO. *Established 1806*

Prevent this

Good looks ruined by unhealthy teeth

Bad Teeth Destroy Beauty and Health

Authorities Call Tooth Care Surest Treatment for Good Looks

MANY diseases that bring premature old age are traceable to teeth. Dreaded rheumatism, heart disease and other infirmities that ruin health and beauty can be directly caused by tooth infections.

One great newspaper says editorially:

> "Thousands are killed every year by their own teeth, and millions suffer rheumatism and other troubles, including kidney trouble, because diseased teeth poison the blood. Get the best brush, the right cleaning substance, keep your teeth clean scientifically and you'll live longer."

Prevention of tooth decay is vital to health and beauty. Cleanliness is the most effective method.

John Sayre Marshall, in his work on "Mouth Hygiene", says, "Cleanliness of the mouth and teeth is the greatest of all prophylactic measures which can be instituted against dental decay".

Conditions can be greatly improved.

Give yourself a chance!

Preventive dentistry is sweeping the United States. Here is a church clinic where children are given a chance to escape disease.